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Gleanings in Bee Culture

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307

VOL. XXXV.
NO. 10.



LE. DUGGER

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GLEANINGS IN BEE CULTURE

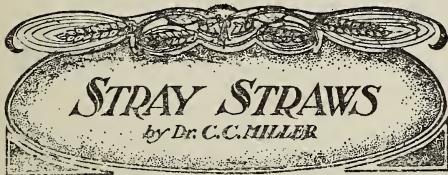
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THAT MAXIMUM of 30,000 to 60,000 bees in a colony needs reconciling with the "40,000 to 70,000 cells occupied with eggs and brood," p. 624. Besides, 60,000 as the greatest limit is antiquated, very. [Probably it is.—W. K. M.]

E. E. HASTY reports in *American Bee Journal* the first pollen-gathering record for 28 springs. The earliest was March 2, 1882, and the latest April 18, 1897, a difference of 47 days! Who says we have a monotonously uniform climate?

G. M. DOOLITTLE, in *American Bee Journal*, advises putting brood in spring in the center of the hive, so that bees may expand in both directions. I've always put it to one side as a matter of convenience, but his may be the better way.

J. E. CHAMBERS says in *American Bee Journal* that for years his bees have worked on sumacs three miles distant, to the neglect of like plants on like soil only a mile away, and his Carniolans are seen by the thousands five miles from home, no other Carniolans being in the surrounding country.

W. A. PRYAL kills moth-larvæ by shaking them out on a black cover for the hot sun to kill.—*American Bee Journal*. Good way if they are obliging enough to come out and the sun is hot enough. [But Mr. Pryal afterward set combs out in the sun and said, "Larvæ came hustling out . . . and soon died" We understood that the heat drove them out.—ED.]

R. F. HOLTERMANN says, "Cut the wings on both sides evenly," p. 620. Why on both sides? Possibly that the queen may be more readily found. A queen can make a better stagger at flying with both wings clipped

than with only one (try it with a pigeon and see). I'd rather have the wings whole on one side to pick up the queen by. [It is generally advised to clip the wings on one side for the reasons given by Dr. Miller. We should want one pair of wings by which we might pick her up.—ED.]

SUMAC (*Rhus glabra*) seems a more important honey-plant than it has generally been considered, p. 626. But the sumac of Texas must be something quite different. J. E. Chambers, *American Bee Journal*, page 279, speaks of its "great creamy blooms" and "the creamy white of the flowers." One must look close at *Rhus glabra* to see it has any bloom at all.

THAT CUMARIN, from sweet clover, resembles vanilla, p. 615, interests me. Years ago I reported honey that appeared to be white-clover honey deliciously flavored with vanilla, and I suspected there might be a little sweet-clover honey in it. This cumarin business confirms the suspicion. [The animals seem to think it contains too much vanilla. Of course, the flavor gets into the honey.—W. K. M.]

PROOFS are multiplying that unrelated laying queens may exist in the same colony. There's J. A. Green, p. 618; and Herr Stumvoll reports in a late German bee journal that he found three laying queens in one colony—one in the super with a fine brood-nest, and two in the brood-chamber. But to E. W. Alexander belongs the great credit of being the first to tell us he has put that knowledge to practical use.

E. MEAKER wants me to tell why it is that in pits or clamps with no ventilation bees winter well, although the hives and combs are quite damp and moldy, and yet it is generally insisted that bee-cellars shall be dry and well ventilated. Strictly speaking, there is a little ventilation in the clamp, for a clamp in stiff impervious clay will not work. The pit holds the temperature evenly at a point where bees are nearly dormant, using so little air that the limited ventilation suffices them. They winter, not because of the moldy dampness, but *in spite* of it.

"But are you not referring to the *dual plan for introducing*?" In our opinion the Jay did not mean that," footnote, page 611. Sure, that's just it; heretofore the term "dual-queen system" has been restricted to that introducing plan; but if the Jay goes to using it for other things—well, the Jay ought not to do that sort of thing. [A distinction should be drawn, surely. Can you suggest a set of terms that will do this?—Ed.]

"NORMAL RESPIRATION of the bee is three or four times a minute; under abnormal conditions, as high as 124," said Mr. House, at Ontario convention. After-thinker Hasty timidly gives a half-assent to this in *American Bee Journal*, but seems to think that it is not generally known that bees breathe. I wonder, now, whether there are many of the brethren who never noticed a bee panting at the entrance on returning from the field, its abdomen extending and contracting like an accordion. Cheshire makes a bee breathe faster than Mr. House, "the normal respirations of the bee, when at rest, varying from 20 to 50 per minute."

MUNICIPAL JUDGE Cleland, of Chicago, one of the most highly respected jurists of the country, says: "Nearly every defendant brought before me for what may be termed 'domestic offenses' spends every cent he makes, whether \$1 or \$5 a day, and almost all of it for drink." And to think that good Christian men are all the time casting votes which practically say, "I give my consent that the law shall throw its protecting arms about the man who sells to these poor wretches that which shall pauperize their wives and children, and ruin their own souls!" [Vote for men who will stand against the rum power irrespective of party. In other words, vote in such a way that the effect will be felt in the immediate future, and for all time.—Ed.]

THAT DOCTOR who, last summer, in one of the bee-papers, wrote ecstatically about his "new discovery" of two laying queens in one hive, mother and daughter, to whom reference is made by Mr. Pressler on p. 617, must have been taking the bee papers without reading them. So many cases of the kind (mother and daughter in the same hive) have been reported that one may indeed ask whether it is not the rule instead of the exception that a superseded queen disappears only after her daughter begins laying. Neither is it any thing so very new to find two unrelated queens laying side by side. I reported a case some years ago, and also another case in which two unrelated queens peacefully remained in the same cage. [But even you, with your forty years' experience, have seen only two cases of a plurality of unrelated queens in a hive. To make a practical application of the idea is new.—Ed.]

PROF. COOK, if you weren't so far away I would like to sit down with you and coax you to put in some exceptions or modifications to about all of the things "what we know" to such a dead certainty, from evolution down, page 621. I'll mention only one

—queen-excluders. For years I've produced sections without thinking it worth while to use them, with 150 excluders lying idle. Lots of company too. If you find them necessary, I wish you would tell us whether your sections are filled with foundation. For extracted honey we've been in the habit of saying that excluders were absolutely necessary, but when such good bee-keepers as Messrs. Dadant and Townsend say "Better not," it isn't best to be too sure. [I agree with you, doctor, and will add another to the objectionable list. Prof. Cook states that one entrance is sufficient for one hive at all times. Do you subscribe to that doctrine?—W. K. M.]

PROF. BRANDER MATTHEWS says: "English is gradually becoming the world language. There are 130,000,000 persons who speak it to-day, and over Continental Europe it is struggling to supplant French as the 'second' language. If the incongruous spelling which Europeans can not understand, and seem unable to acquire, can be simplified there is great likelihood that English will supplant French as the world language." So if you want GLEANINGS to help make English the world's language, get busy reforming its spelling. [Y-e-s, but it would be like casting a pebble against a stone wall, and we refrain for the present, or until a few big fellows begin throwing boulders.—Ed.]

[AUX chât, doctor! Don't you know that French has been the court language of Europe for centuries, and yet its spelling is so much more difficult than English that comparison is useless? About 35 per cent of the printed French consists of silent letters. The Spanish spelling is entirely phonetic, as you want English to be, and yet the language is falling off. Changing a nation's spelling is a difficult thing toutdoux. Ne le savez-vous pas?—STENOG.]



HARD crystallized rock candy in lieu of sealed stores has served an excellent purpose during the cold month of April.

ALL hives should be looked over carefully to see if any lack stores. The backward spring, with almost no opportunity to gather any honey, will render feeding necessary in many cases.

QUEEN-BREEDERS in the South as well as in the North have been so delayed by the very backward spring that they will be unable to fill orders for young queens as early as usual. Bee-keepers should be willing to extend them a little leniency in time.

WE are pained to record the death of Julius Hoffman, the inventor of the frame bearing his name, at his home near Canajoharie, N. Y. We received notice of this too late for further comment in this issue.

DON'T be discouraged, even if the season has been backward and you have lost many colonies. With a lot of hives and good combs, many of them containing stores, you can very soon, by dividing, get back your bees, even if you don't get much of a crop. Give the bees a chance.

LATEST FROM CALIFORNIA.

JUST as we go to press with this form, late reports, both from Central and Southern California, are somewhat discouraging. There may be a fair crop from both sections, and there may be an entire failure. The next few days will tell the tale. Some of our Southern States seem to have had a severe setback by the backward season.

DR. BIGELOW PRESIDENT OF THE AGASSIZ ASSOCIATION.

OUR esteemed friend Prof. Edward F. Bigelow has just been elected, to the presidential chair of the Agassiz Association, a world-wide organization having for its object the popularization of nature study and outdoor science. In connection with the election of Dr. Bigelow it has been decided to erect a building for a permanent headquarters for the society, and in addition a museum, library, and a model school of nature study, all to be located in Stamford, Conn.

It ought to be stated that the Agassiz Association is not a combination of scientists, but, rather, a collection of people who are endeavoring to extend their knowledge of animated nature; and it rather aims to interest ordinary every-day people who wish to educate themselves along such lines. The work is particularly interesting to teachers.

We are certain of one thing, Dr. Bigelow will not neglect the study of bees in connection with the work he has undertaken, and an apiary will surely form a prominent part of any nature-study enterprise with which he has to do. For this reason, and the fact we are well acquainted with the doctor personally, we wish the Association every success.

Those who may be interested in this kind of work, and who desire more information, should apply to Dr. Bigelow, Stamford, Conn., for all particulars.

GRADING RULES.

ONE of the difficulties met in the honey market is the lack of uniform grading-rules and rules governing the sales of honey throughout the United States. The well-known Colorado rules have been adopted by nearly all dealers and bee-keepers in that State, whether members of the Colorado associations or not, and these rules are pretty well known in many of the Eastern markets. Throughout the East and other sections of

the United States, however, various other rules, adopted either by the National or local associations, are employed; and in the absence of a definite agreement between shipper and buyer a great deal of trouble arises at times. Our attention is brought to the work of the Produce Reporter Co., of Chicago, in a letter received, under date of April 5, from Frank Rauchfuss, Denver, as follows:

As you will see by the enclosed booklet, this company covers most of the trade that is interested in the handling of honey in a jobbing way; and by getting them to adopt grading-rules which will be just to the producer as well as the dealer, and sufficiently elastic to cover every section of the United States, a great good will be done to the bee-keeping industry, because alongside of better prices, what we need very much a sufficient protection of the shipper against the dishonest commission man and jobber. I take the liberty of calling your attention to this, as I know you have the best interest of the producer at heart.

We quote also from the booklet referred to:

TRADING RULES AND GRADES.

These are published in our credit-book for the government of contracts between subscribers. Subscribers are expected, as far as possible, to insist also upon the agreement to these rules by all of their customers. This is accomplished by publishing on their stationery and by incorporating in their quotations or orders "All contracts governed by Produce Reporter Co.'s Rules and Grades."

GRADE-TERMS ARE DEFINED

upon potatoes, apples, cabbage, beans, peaches, oranges, tomatoes, etc.

TRADE-TERMS ARE DEFINED

such as "prompt shipment," "quick shipment," "carload," etc.

RULES GOVERNING

"F. O. B. sales," "weights," what constitutes acceptance, joint accounts, "Advance on consignments," payment of brokers, brokerage rates on different products, etc., etc., are plainly laid down.

ADJUSTING RULES

and ways to handle rejected shipments equitably to both the shipper and receiver are provided. These are published in the "Credit-book."

AMENDMENTS AND ADDITIONS

will be made to meet the experience and growing requirements of subscribers.

The columns of GLEANINGS are open to any suggestions from parties along this line.

REPORTS OF WINTERING AND SPRINGING CALLED FOR; THEIR BEARING ON THE MARKET.

We shall be pleased to get reports of the condition of the bees over the country generally. It is very important to know the *exact actual* conditions, as they necessarily have a strong bearing on the market. In this connection bee-keepers should realize that it is a serious thing, in that it reacts like a tremendous boomerang, to make out the situation for their localities worse than it really is; for while this has a tendency to stiffen the market *temporarily* the result is almost sure to be disastrous in the end. The effort to bull the market by giving out the information that "there is no honey in sight," "season a failure," etc., after a fair crop has *actually* been obtained, is sure to demoralize prices later on. When that unexpected crop begins to unload on the market, then it is that the market begins to tumble, buyers become panicky, with the result that they will put prices clear down, where they will stay,

even after the available supply has been exhausted. This has actually happened more than once and the mistake should not be repeated.

Better by far give the actual conditions, for this has a tendency to *steady* the market. It should be remembered that a *steady* market with a *slight upward* tendency is far more to be desired than one that jumps up suddenly and then begins to fall, fall, fall, until a low level is reached. No amount of *bullying* the market after that will restore prices.

In the meantime honey-men, having bought largely at low prices, are well stocked; and then if the market does advance, *they* get the benefit, not the bee-keeper who has sold out.

Send in your reports briefly on a postal card, *never writing more than two or three sentences*. If you send in long ones they will be thrown into the waste-basket, for it is simply impossible to summarize a large number of reports when bee-keepers write long letters or mix their crop data in with other business.

A BACKWARD SPRING AND ITS EFFECT ON PRICES.

NOT since 1881 has there been such a backward spring over the country generally; for, judging by reports, it seems to have been almost universal. The exceptionally warm weather during March was followed by chilly and cold weather, for nature seems to have a fashion of striking a balance when she gives us one extreme by giving us another.

In our more northern States there were cold rains, and snows to the depth of several inches. In vain did bee-keepers watch for better weather; but day after day the cold spell continued, breaking all records except those of the spring of 1881. Speaking of that year reminds us that there was a heavy mortality from spring dwindling—the heaviest ever known, probably, in this country. The lessons learned then showed conclusively the value of protection in the spring as well as during winter; of the importance of having a first quality of honey, or, better, sugar syrup, as a winter and spring food. But for the knowledge then acquired, the experience of the spring of 1881 would have been duplicated this year.

We were fearful that the brood-rearing that started during the warm weather in March would cause a general consumption of stores, and that cold weather following so soon would be a serious setback, because the bees in their efforts to protect the brood would themselves be chilled to death as well as the brood. We were expecting some very bad reports; and while some few of them have been coming in showing heavy losses in the northern portions of some of our northern States, the reports, as a whole, to say the least, are not unfavorable. We were fearful that we should find a large portion of our own bees dead, but we were agreeably surprised to find that spring dwindling was not nearly as serious as we apprehended it might be.

Of course, the bees all over the country

have had a serious setback; but the majority of them have nearly held their own. As bees generally wintered well, they are now, May 3, able to make a fair start; for it should be understood that everything else has been set back including our honey flora, by about a month. This will give the bees a chance to make up for lost time, and the probabilities are they will do so with proper care, stimulative feeding, and the right kind of protection.

But in saying this much it must not be denied that there will be a large number of bee-keepers who will suffer heavy losses, and who will hardly be in shape to gather a crop of honey, even if the supply of nectar should be abundant when the season opens up.

As pointed out in our last issue, there is not likely to be a glut of honey in any of the markets of the East. Reports from California are still conflicting, some saying there has been too much rain, and others that conditions have been favorable for good crops. In Central California conditions seem to have been more favorable than in the southern part of the State. The probabilities are that both the northern and southern portions will be able to send some honey to the East unless the season should be very unfavorable during the time of nectar secretion.

SOME LESSONS GLEANED FROM THE BACKWARD SPRING.

THIS peculiar chilly April has laid strong emphasis on some important factors for good wintering and good springing. Many of us have come to learn that it is one thing to *winter* and another thing to *spring* bees. This fact has been forced upon us this season if it ever was. Well, what have we learned?

VALUE OF PROTECTION IN SPRING.

First, those colonies that were well protected in double-walled hives or in winter cases, after being put out on their summer stands fared much better than those without such protection. Of course, we knew it before; but we don't always practice what we believe.

CLOSED-END VS. OPEN-END FRAMES.

Again, other things being equal, colonies on closed-end frames showed up much better than those on open ends. Indeed, in our own experience bees on the former single-walled hives seemed to hold their own as well as those in chaff hives with open-end frames. While this fact has been demonstrated to us before, it was never more clearly shown than this spring.

We have had reports from quite a number who originally opposed closed-end frames—"wouldn't have the intolerable bee-smashers," as they termed them, even if they could "get them as a gift," but after giving them a trial they found them not only not so disastrous to bee life as they supposed, but exceptionally well adapted for springing the bees.

Claims for the good wintering and wintering qualities of the closed ends have been

made by bee-keepers who have followed in the wake of Quinby, Elwood, and Hetherington in Central New York and elsewhere, time and time again, but they were scouted as being unorthodox. The fact that some of the old advocates of open-end frames are now beginning to acknowledge that they may be better for brood-rearing in the spring is significant.

GOOD FOOD.

Another fact that the backward spring has jammed into us again is the value of good honey or sugar syrup, and lots of it. Fortunately it is for those bee-keepers who had their lives well filled with stores.

PROTECTION FROM THE PREVAILING WINDS.

Another fact was the value of suitable windbreaks. Those of our colonies that were protected by buildings, or a heavy growth of evergreens, or a tight board fence, were in very much better condition than those where the piercing winds could sweep down upon them. It is noticeable, also, that those bees whose entrances face either north or west suffered more than those facing the other two points of the compass.

GOLDEN ITALIANS THE CHIEF SUFFERERS FROM SPRING DWINDLING.

As heretofore, so this year, the golden Italians have suffered from spring dwindling more than all the other bees in our yards, notwithstanding some of them were populous the previous fall, with plenty of good stores and protection.

CAUCASIAN AND BANAT BEES.

In this connection it seems to be quite clear that the black races are good bees for a bad spring. Our Caucasian and Banat bees are in good condition. Considering the fact that their native home is much colder than that of the native Italians, it is not, perhaps, quite so surprising. But we observe that the leather-colored Italians—those from Northern and Central Italy—held their own equally well.

THE JAMESTOWN EXPOSITION; THAT MILLION-DOLLAR BEE OF THE EDITOR'S.

The editor has just come back from the opening of the Jamestown exposition, which took place April 26. As he is a member of the Ohio Commission, to look after the interests of Ohio at this exposition, he was given exceptional opportunities to learn the facts.

At the time of the opening there were but very few of the buildings completed, and fewer still with any exhibits installed. It will be fully a month before some of the buildings will be completed and the exhibits in place. But when the exposition is once ready it will be one of the best that the world has ever seen.

The naval display at Hampton Roads, just adjoining the exposition grounds, on the day of the opening, was probably the most magnificent and imposing that the world has ever seen. Indeed, experts have stated that it far surpassed the naval display on Queen Victoria's jubilee in 1887. The rumble of the

300 guns saluting President Roosevelt when he came down to the exposition in the Mayflower was something terrific. The exposition grounds shook as if there were a small earthquake. And why shouldn't they when something like 100 men-of-war and some 40 first-class battleships in the bay were thundering forth, *not notes of war, but peace?*

The President's speech to his 54,000 people brought down round after round of applause, and the military columns that passed by in review could not fail to stir up every loyal heart.

This exposition will be different from all others in the fact that the great majority of the buildings are permanent—not temporary like those at Chicago, Buffalo, and St. Louis. Instead of seeing a white city one sees actual brick and stone construction. The whole exposition has been laid out as perfect as any city, and, in fact, it seems to be a part of Norfolk, or, perhaps, will be; for be it known that that city may be a rival to the great city of New York, both in business and population. This seems like a wild statement; but some competent observers see no reason why it may not some day be true. At the present time it is regarded as the Seattle of the East.

But this exposition differs again from all others in that it gives a large emphasis to the general subject of history. Hampton Roads—in fact, this whole section of country—has been the scene of three wars, and where, too, many of their decisive conflicts have been fought out. Incidents and scenes dear alike to the North and the South were enacted within plain sight of the exposition grounds. In fact, right in front of them was fought the historic battle between the Merrimac and the Monitor; and so important was that battle that all naval warfare from that time on was entirely changed.

We suggest that the Western visitor go to the exposition by way of Washington, stop there for a day or two in that city of magnificent distances with its historic associations; then take the steamer down the Potomac; and as the magnificent vessel glides down the river, historic scenes greet one at almost every turn—the church that Washington attended, his home at Mount Vernon, the forts that were literally tried out as by fire, indeed, the heart of every loyal American can not help being stirred to its depths as he takes this beautiful ride down the river and bay where United States history, or a great part of it at least, was made.

Perhaps all of this may seem to be of but little importance in a bee journal; but permit us to say right here that the Jamestown exposition will give a large emphasis to bee culture. The Ohio exhibit, for example, in the States Building, will be something that will attract attention as being out of the ordinary line. On the Warpath, as mentioned in our last issue, Mr. Chas. Koeppen, of Fredericksburg, Va., is preparing to make a magnificent display of bee-demonstration work.

Perhaps in this connection it will be interesting to some of our readers to learn a joke on the editor. He was introduced to a num-

ber of the high officials as the man who owned a million-dollar bee. He expostulated, of course, that the story was *slightly* exaggerated. Yes, we plead guilty to having a bee once that we valued at \$200. When she died we put her up in alcohol and displayed her to the public. The newspapers got hold of it and told about Root's \$200 queen-bee with a pedigree having sons and daughters that were celebrated. But the average newspaper could not be satisfied with such a tame statement, so it kept adding on ciphers every time the story was repeated until the queen had a value of \$1,000,000. The next thing we knew it was repeated in Germany that we had a queen worth \$2,000,000. Like the proverbial story of the crows, it kept on growing by repetition.

Somehow the people at the Jamestown exposition had heard that we were the owner of that bee, and many were the jibes that we received. The fact that this bee, or "bug," as they called it, even if she were worth only \$200, had a "pedigree," "daughters and granddaughters of note," was very funny; that a lot of "bugs" could be sick, have dysentery and contagious diseases, was stranger than fiction itself.

IRRIGATED LANDS BEING OPENED UP FOR BEE-KEEPERS.

Most of the regular readers of **GLEANINGS** are probably aware that the irrigated regions of this country are admirably suited to bee culture; but probably some are not so familiar with the great work being done by the United States government in reclaiming vast areas of arid land by means of dams and canals. Others are anxious to know just where each particular work is being done, and how large it is; hence a short sketch of what is being accomplished will not come amiss.

The work of reclaiming is paid for out of the sale of public lands; but in every case the land irrigated pays for its own irrigation, the settlers under each ditch paying ten per cent of the cost each year for ten years. This makes the burden easy, and at the same time makes it possible to get a home. The work of reclaiming is, therefore, revolving, and may go on for ever. In any case it costs the government not a cent.

In no case is a farmer allowed to own more than 160 acres, and on some of the projects only 40 acres is allowed. This insures a square deal to all; for it prevents the land-agent from buying up all the territory at a low figure and then selling to the settler at exorbitant prices. This system allows good graded schools, churches, and other social advantages not obtained in sparsely settled communities.

It ought to be noted in this connection that the climate in every case is good, and also that an ample supply of water is secured for all time, for the work is practically imperishable. The example of the government has in some instances spurred private enterprise to engage in similar projects.

As to total cost, which seems large, it has

been estimated by engineers that one year's crops will pay every cent of the actual cost of the projects now under construction. By the expenditure of about \$60,000,000 the national wealth will be increased \$230,000,000.

From the bee-keeper's point of view, an irrigated section is a sort of elysium, from the fact that the weather is always dry, and often warm; besides, there is an abundance of flowers, owing to the greater density of floral vegetation due to a regular supply of water and absence of washing rains.

Some of the irrigation work reflects great credit on the engineers engaged. The Engle dam will back the great Rio Grande for 40 miles, and control the largest floods on that river of floods. The Tonto dam will use 240,000 barrels of fine cement, made right on the spot, and bury the town of Roosevelt 200 feet deep with water. The Shoshone dam will be 310 feet high, and the Uncompahgre project involves a tunnel through the mountains, six miles long. Verily "Uncle Sam" does things and does them well.

RECLAMATION PROJECTS NOW IN PROCESS OF CONSTRUCTION.

Name.	Irrigable Acres.	Cost.
Salt River, Arizona.....	200,000	\$5,300,000
Yuma, Arizona-California.....	100,000	3,500,000
Uncompahgre, Colorado.....	150,000	5,200,000
Minidoka, Idaho.....	80,000	1,800,000
Payette-Boise, Idaho.....	120,000	1,600,000
Georgetown, Kansas.....	8,000	200,000
Milk River, Montana.....	40,000	1,500,000
Muntley Mountain, Montana.....	33,000	900,000
Sun River, Montana.....	16,000	500,000
North Platte, Nebraska-Wyoming.....	110,000	4,100,000
Truckee-Carson, Nevada.....	200,000	4,000,000
Hondo, New Mexico.....	10,000	336,000
Carlsbad, New Mexico.....	20,000	600,000
Rio Grande, New Mexico.....	15,000	200,000
Lower Yellowstone, Mont.-Dakota.....	60,000	2,700,000
Buford-Trenton, North Dakota.....	40,000	1,270,000
Klamath, Oregon-California.....	50,000	2,100,000
Umatilla, Oregon-California.....	18,000	1,100,000
Big Four, South Dakota.....	100,000	3,000,000
Strawberry Valley, Utah.....	35,000	1,850,000
Okanogan Valley, Washington.....	9,000	500,000
Tieton, Washington.....	24,000	1,400,000
Sunnyside, Washington.....	40,000	2,000,000
Wapato, Washington.....	20,000	600,000
Shoshone, Wyoming.....	100,000	3,500,000

Total—

1,598,000

\$50,121,000

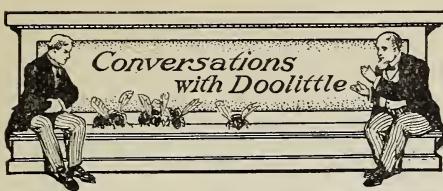
There is also a project at Engle, New Mexico, which will be undertaken as soon as the necessary legislation can be obtained, as it involves old Mexico. Congress has provided an appropriation of \$1,000,000 to provide for Mexico's share of the cost, but the total cost will be \$7,200,000, and the area irrigated will be 180,000 acres in New Mexico, old Mexico, and Texas.

PROJECTS AWAITING FUNDS.

Name.	Irrigable Acres.	Cost.
Little Colorado.....	80,000	\$4,000,000
Sacramento Valley, California.....	500,000	20,000,000
San Joaquin, California.....	200,000	6,000,000
Colorado River, Utah, Col., Ariz.....	750,000	40,000,000
Dubois, Idaho.....	100,000	4,000,000
Lake Basin, Montana.....	300,000	12,000,000
Las Vegas, New Mexico.....	35,000	1,500,000
Urton Lake, New Mexico.....	35,000	2,000,000
Walker-Humboldt Rivers, Nevada.....	500,000	15,000,000
Red River, Oklahoma.....	100,000	4,000,000
John Day River, Oregon.....	200,000	10,000,000
Wasatch, Utah.....	100,000	5,000,000
Priest Rapids, Washington.....	50,000	2,000,000
Goshen Hole, Wyoming.....	120,000	4,000,000

Total estimated cost..... 3,270,000 \$129,500,000

The Secretary of the Interior, Washington, D. C., has charge of this work, and particulars of any of these projects may be had by writing to him.



THE IMPORTANCE OF HAVING ALL BROOD-COMBS FILLED WITH BROOD AT THE BEGINNING OF THE HARVEST.

"How are the bees prospering, Mr. Smith?"
"Seem to be doing fairly well, Mr. Doolittle. Some of my hives have frames in them which are already nearly solid with brood."

"You mean that now and then a colony has one or two frames near the center of the brood-nest in which the brood comes out nearly to the bars of the frames where the brood is the furthest extended near these bars."

"Yes, I guess that would express it better. I find that the queen lays her eggs somewhat on a circular plan rather than in the square form of the frame, and the eggs the furthest out on this circle of brood in each frame comes very near, or so that the cells containing them touch the wood of the end-bars and the top and bottom bars of one or two frames in some of my best colonies. Is that good for the fore part of May?"

"Very good indeed."

"I thought it good; and if I can have the whole number of frames in the hives, on all but two or three, filled as some of these are when the honey harvest commences, I think I shall secure a good yield of comb honey."

"Aren't you a little modest in your wishes?"

"I did not think so. This is about as good as I ever have frames filled with brood at the beginning of the honey-flow. Can you do better?"

"I try to. I fear your hives may be too large if you do not get your combs nearer full of brood at the beginning of the honey harvest from white clover about the middle of June."

"Perhaps you may be right, for a successful bee-keeper told me at our last New York convention that he reduced the size of his hives a few years ago, after which it was no uncommon thing to have the combs in his hives with the brood touching the bars on all edges of the combs."

"In this that bee-keeper gave you one of the greatest reasons for his success, although he might not have known that he was doing so."

"Perhaps not; for his main claim for his success was that the hive which he used was a good one."

"Just so. And I claim that the main reason for its being a good hive, and the main reason for his success with that hive, is and was because he could thus secure the brood in the frames. Few seem to realize that, unless the hive is so filled with brood at the

commencement of the honey harvest that it comes out to the frame-bars in the most of the combs, there is not so good an assurance of a good crop of section honey, no matter how profusely the flowers may bloom, nor how abundant the secretion of nectar in those flowers."

"I can hardly understand that. Please explain."

"With plenty of unoccupied comb in any hive at the commencement of the honey harvest, goes the assurance of plenty of honey in the sections; for plenty of honey in the sections, and much unoccupied comb in the brood-chamber to the same hive, do not go together."

"Why not?"

"Because, to give the best results the combs remaining in the brood-chamber at the commencement of the honey harvest must be literally *filled with brood*, otherwise the bees will commence storing their first honey in the empty combs in the brood-chamber instead of the sections, then keep crowding down the queen till, at the end of the season, we shall have little honey in the sections, with few bees in the hive for winter. But with the combs full of brood, the first storing is done in the sections, and, having commenced work herein, the bees continue (not thinking of crowding out the queen at all), with little honey being put in the brood-chamber till near the close of the season, when the queen slacks in brooding of her own accord."

"But with me I have only the corners of the frames without brood, and perhaps two-thirds of the two or three outside combs, at the commencement of the harvest, and I had always supposed this was very good indeed."

"This is not so bad as more empty comb would be, but it is proportionately bad, and tends toward a decreased yield of section honey. If you had 100 colonies of bees, and this state of affairs detracted 10 pounds from the yield of each colony on an average, your loss for just one season would be 1000 pounds of honey. And this would not be for one year only, but for every year you continue so to use your hives. And as you would probably do nearly as much work, taking the whole season together, with your bees losing this 1000 pounds, as you would to secure it, it would amount to quite an item to you in the course of 25 years."

"Well, how can I remedy the matter without procuring all new hives?"

"This is the way I do: I get, out of inch lumber, enough boards of the same size of my frames so that I can have an average of two of these to each hive I have colonies of bees in. To these boards are nailed top-bars to my frames, so that each board can be hung in the hive the same as a frame can, and which will take the place of any frame I wish to remove at any time. These boards I usually call dummies, though they are often called division-boards. At the commencement of the honey harvest I look over every hive having bees in them and set apart all colonies which seem strong enough to work in sec-

tions at all, for that purpose. The average of such set-apart colonies which have their combs full of brood clear out to the bars of the frames will be about one-third of the whole, then there will be about one-third of what is left that will have one frame in the hive with no brood in it. This frame is taken away, and one of the boards hung in its place. Another third will have brood in only eight of the ten Langstroth frames I use in a hive, and the two frames having no brood in them are taken away and two of the dummies put in their place. The other third will usually not be as good as these last, owing to poor wintering, poor queens, etc., and these may have brood in only seven combs, or an occasional one may have only six frames containing brood. But, no matter what the number, all frames not having brood in them at the extreme beginning of the harvest are taken away, and dummies put in their places. In this way each colony is prepared to work in the sections in accord with the number of frames occupied with brood, and will give results in about the same proportion as to the brood they have."

"Suppose you find a colony with brood in only five combs. What then?"

"That depends very largely upon what my wants are, and what their condition as to queen, etc. If I can not use them to better advantage, and the queen is young and vigorous, and has been kept back through lack of bees from poor wintering or something of the kind then I run such for section honey, using their five frames of brood and five dummies. I would far rather allow a colony to go into the honey harvest with only five combs filled with brood, and five division-boards, than to have the same colony with five frames with brood and five empty combs, or have these five combs of brood scattered all about the hive in the ten combs. Herein is something the apiarists of this country do not put enough thought and study upon, to say nothing of their every-day practice."

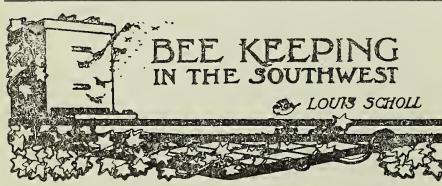
style $\frac{1}{2}$ -inch bottom, well painted, is hard to beat, and, if made of cheap but good material, is cheap enough for anybody. The fact is, the lighter ones cost the same. While I have hundreds of heavy bottom-boards still in use, for ten years or more, the one hundred thin ones purchased four years ago are rapidly going to pieces.

We are giving "splints" a trial this year to stay foundation in frames, such as Dr. C. C. Miller speaks of in his book, "Forty Years Among the Bees," p. 88; but we are not having the success with them we had hoped to have. The bees seem very much inclined to gnaw around the "splints," and, later, will fill the space with drone-cells. Why they should do this we can't tell unless we had the wax too hot when we waxed the "splints," and failed to get them well coated with wax, writes L. B. Smith, of Rescue, Texas. There may be several reasons for the trouble, but I withhold mine until Dr. Miller tells us. What was it, doctor?

Swarming was over! How could I tell? The apiary had not been visited for eight months until April, when swarming should have begun. There were drones by the thousands, some at *every* hive. The stores in the hives had run down, almost exhausted, and just enough honey had been coming in to stimulate the bees so that all the colonies were in a rousing condition. More stores or more honey from the fields would have meant swarming; but, instead, it was given up. This is how I told: *Every* colony in the apiary was driving out and killing off its drones. There will be a good deal of honey coming in now; and all that is necessary is to provide room and prevent a crowded condition. So, supers were given—shallow extracting-supers with combs or full sheets of foundation, which will be full (or nearly so) by the main flow when the comb-honey supers are slipped in.

"The year 1906," says one of my correspondents, "will be long remembered as a year of an unusual amount of bloom of all kinds, and yet it was one of the poorest years I ever saw for bees in this locality. The year 1907 has so far had the fewest flowers since many years, caused from the excessive drouth of last season, and the bees seem to be doing even better than at this date last year. We wonder if we shall be surprised with a bountiful honey crop in 1907."

Such are some of the conditions that have to be surmounted in our predictions for the season in this country. There may and there may not be a good crop. The season is yet too long for anybody to be able to tell at this time. In Southwest Texas a good deal of honey has been obtained this spring in a number of localities, and prospects are favorable. Other portions of the State have not had any surplus honey yet, but generally the bees are in good condition for the season. The April mesquite flow came in March here—much too early for the strength of the



The higher price of wax should have a tendency toward less drone combs in the hives. "Cut it out, melt into wax, and cash money for it," seems to me worth thinking about. But since foundation will be correspondingly higher I wonder if it will be used in full sheets to as great an extent.

Abominable makeshifts of bottom-boards are the flimsy things put out nowadays by the majority of hive-makers. A thorough trial given these for several years has set me against any "flimsy" supplies. The old-

colonies. The hives were full of brood, but the bees had to "play nurses" instead of storing honey. When the force of gatherers was on hand, mesquite bloom was over. It was impossible to get the colonies into proper shape so early. A great consolation is that the mesquite blooms again in June or July, and preparations for that flow will be made. Cotton is the only other important source with me at most of my yards, and begins after mesquite and lasts until fall. Some of my yards often get surplus honey from sumac in the fall, and store up well on broomweed, so they are in fine condition for the winter. There are a great many other sources of honey, but of minor importance. Cotton is not counted on as a honey-plant for Southwest Texas, while it is throughout the black land, or cotton-belt districts.

POULTRY, BEES, AND FRUIT.

They say that the above makes a fine combination. I've thought it worth while to try it and—get rich! While I am writing this I am at one of my out-yards, 197 miles away, and have been musing in this wise: "Suppose I had not a good better-half at home—how in the world would I be able to feed several hundred chickens, hunt the eggs daily, and—well, enough! If I stayed at home, on the other hand, how would I be able to keep the bees from swarming at this long range? There are two apiaries here, besides eleven others a *little* nearer home. No, I can't do the stunt by myself; besides, coming to the fruit part of the combination, the schoolboys who pass the large or hard every day are already keeping their eye on the largest of the ripening fruit; and if I am not there during the nights of the next moon I am afraid those fruits will belong to somebody besides me. Now the question is, How can I keep poultry, bees, and fruit successfully? or if I can't do it, which should I give up? A person favorably situated can combine the three quite profitably in two ways, I think. The first is on only a small scale—an orchard of fruit, to be used for the poultry-yards, and the apiary, *in the same place*. The poultry can be attended to in the morning and evening; the bees during the warmer part of the day, while the fruit is looked after between times. A home market should be worked up by such a producer, and there should be no trouble in making a lucrative business out of it. To combine the three in any other way would mean to carry them on on such an extensive scale that extra help could be hived, so each of the three can be looked after properly. I don't know but such a combination might be made profitable.

Since this is the day of specialism, it may be better not to make the combination, but take up only one of them by itself and specialize in it. That is what I have concluded to do since I have had the experience of finding that a bee-keeper can not make the *most* out of bee-keeping if he dabbles in any thing not pertaining to bees.

Yes, there's much good advice in Mr. Hutch-

inson's words, "If you want to combine any thing with your bee-keeping, get more bees." But locality has much to do with this subject. Where out-yards can be established, such advice is good. If locations are limited, then something besides bees must be added. Since there are many localities where only one apiary can be kept, the above combination would still be a good one. For the one wishing to specialize, another location would have to be sought. It is well to adapt ourselves to conditions surrounding us, whether specialization is being preached or not.

TO KNOCK SWARMING ON THE HEAD.

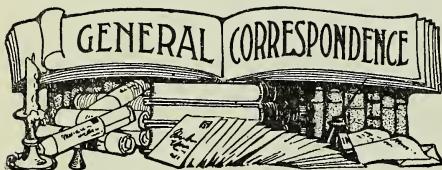
To prevent swarming I have proceeded as follows for many seasons: The main object with me is to break up the solid brood-nest and its crowded condition, affecting the whole colony, and bringing on the swarming fever. Providing laying room for the queen is important toward securing a large lot of young larvae for the great army of young nurse-bees to get rid of the accumulating chyle. At the same time, clustering room for the bees is provided. If the desire to swarm can be retarded until the honey-flow begins, the object has been won; for, in most localities of the South, swarming is given up, and the whole energies of the colonies are turned toward rolling in the honey—the swarming seems to be forgotten.

It is easiest accomplished with the divisible-brood-chamber hive. As soon as the bees become crowded, a case of shallow combs is slipped in between the lower and upper cases of the brood-chamber. Here is room for the queen and the bees. The upper case now becomes a super for *extracted honey*, the brood being crowded down, and honey (not used up in the brood-nest) stored in its place. This prevents clogging the brood-nest, which, with us and long flows, leaves the colony very weak for any subsequent flow; or, if later in the season, too weak for successful wintering. At the beginning of the main flow the comb-honey supers are slipped in under these shallow extracting-supers, and the bees go to work at once and finish them better than when simply set on top of a brood-chamber in the old way, and a crowded lot of combs of honey below the supers given. Besides, an *extra super* of extracted honey is obtained.

With the regular deep L. hive it is not so easy, without going to a lot of trouble in handling combs. It is done so extra bodies are prepared with full sheets of foundation in the frames. Then half of the brood-combs are removed from the brood-chamber of each colony and placed in these, alternating them with the frames of foundation. The brood-chamber is arranged in the same way, thus making each colony two-story, with combs of brood and frames of foundation alternating in each story. When the main flow comes, should the upper stories be filled with honey the comb-honey supers can be given under these. But a ten-frame full-depth body is too large for this purpose. The

brood can be crowded into the lower story, and combs of honey placed in the upper one and set on weaker colonies run for extracted honey, while comb-honey supers are set on the colonies in their place. I do not like this method very well, and it necessitates a great deal of handling of combs.

If increase is wanted, it can be obtained nicely, especially if the swarming season comes some time before the main flow. About ten days before you want to make the division, place a queen-excluder between the two stories. At the end of that time take one of the stories (which has not the queen) to a new stand, and give a laying queen or a ripe cell. This will leave the main force on the old stand to begin work in the comb-honey supers put on in place of the upper story just removed. If the division is made earlier, long enough before the honey-flow so that both parts of the division can be built up for it, there should be at least two-thirds of the brood in the story moved to the new stand. A laying queen is to be preferred to giving a cell in this case, as the work goes on much faster; hence laying queens should be provided for in advance.



QUEEN-REARING.

Some Questions Answered Concerning the Age of Drones; the Two-queen System and Other Matters.

BY E. W. ALEXANDER

Referring to my article on page 573, last year, on rearing queens for early increase, Mr. G. H. Smith, of Australia, has asked me several questions by letter, and it may be that my answers will be interesting to the readers of *GLEANINGS*. He wishes to know if it is not necessary for the drone to be much older than the queen in order that she may become fertilized at the proper age. He also thought that, in so large an apiary as ours, natural swarming must be a serious obstacle in securing a large surplus; and as for two or more queens to be loose in one colony, he was of the opinion that it would cause the colony to swarm as soon as the bees realized the presence of more than one queen.

In reference to the age of the drones, I will say that, in natural swarming, we usually find the drone comb of a hive well filled with brood capped, or about ready to cap, when the eggs are laid in the queen-cells. This would show that in nature the greater number of drones would hatch about the same time as the young queens or a few days sooner.

For our early queens, then, we use eggs from our breeding-queen as soon as we find drone brood capped.

As to the number of our natural swarms, that depends much on the season, also on the length of time from one extracting to another. In our apiary about six per cent of the colonies cast natural swarms.

In regard to keeping two or more laying queens in a colony at the same time, and its effect on their swarming, according to our experience so far, it has wholly prevented it, as we have never yet had a colony attempt to swarm that contained two or more laying queens where each had free access to all parts of the hive.

We are now wintering a colony with seven two-year-old queens in it, all loose in the cluster of bees. We saw and counted the queens a few days before putting our bees in the cellar; and up to date, Jan. 30, we have not found any dead queens under the cluster of that colony. The hive is well marked, and I will let you all know its condition next spring and summer.

I expect to test this subject thoroughly and on a large scale another year.

In a short time I will give the readers of *GLEANINGS* our experience in keeping from two to fifteen laying queens all loose, and laying in one colony, without any restriction of queen-excluders whatever, each one having free access to any part of the hive and to each other.

Delanson, N. Y.

[We already have the statement from Mr. E. E. Pressler and Mr. J. A. Green that they have worked successfully with the plurality-queen scheme in one colony, without the use of perforated zinc, so our correspondent is beginning to have some backing, at least. While he merely says he has succeeded, he does not yet give us the plan by which it can be made a success. In the mean time he has left us all curiosity. We hope, therefore, he will not strain that curiosity too long.

Surprising it is, there are so many new things under the sun that old bee-keepers have not known before. Perhaps here is one of them. Possibly it will do no harm to shake up our orthodoxy once in a while; for it is only by getting clear up out of the old ruts that we may perhaps get up on to the better road.

In the mean time we shall be glad to hear from any of our correspondents who have been able to make the two-queen system work in one hive without the use of perforated zinc. Among our 30,000 subscribers there ought to be a few, at least, who will be able to give us a little light on this interesting question.—ED.]

THE final act in creating the great new State of Oklahoma was performed the last week in April, the president of the constitutional convention and all the delegates signing their names to the written constitution with an *alfalfa pen*.

WAX-RENDERING.

Solar Extractors Using Artificial Heat; How I would Build an Extractor if I were to Start Anew.

BY R. C. AIKIN.

In my previous article I described the solar wax-extractor that I have in use. It is my purpose in this article to give a complete plan for an ideal extractor, one that I would make if I were to start anew.

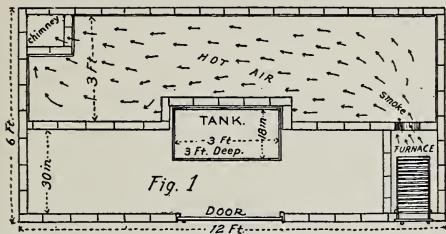


Fig. 1

GROUND PLAN OF AIKIN'S SOLAR WAX-EXTRACTOR.

In the first place I would build all walls of brick, stone, or concrete. Figure 1 gives the ground plan for a solar 6×12 feet, which would have almost 40 square feet of surface in its melting-pans. A single layer of brick is sufficient for these walls, making them four inches. At the northwest corner I have indicated the chimney or smoke-stack, but it is not necessary to build this from the ground up. Start it at the point indicated in Fig. 2. Right here let me warn against making the chimney too small, and this is good advice in building a chimney for any purpose. Four bricks around make a 4×4 opening; five around make a 4×8 , while six around make 8×8 . A half more brick quadruples the capacity. In our residences for a common

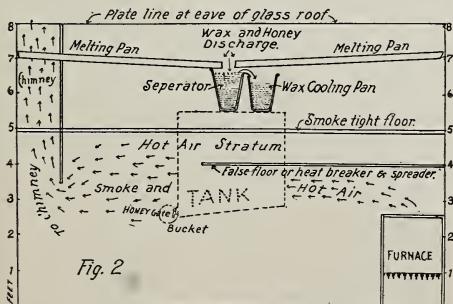
large solar at any time, make it large. You won't need to use it very many times before you have gotten back the extra cost in construction; but I will speak of this again when dealing with the subject of wax-presses.

You will notice that this plan calls for a honey-tank 18 in. wide, 3 feet long, and the same in depth. A round tank would be somewhat cheaper, and may be used, but will not fit in so nicely to economize space. If the round form is to be used, the recess to receive it can be made circular. The size I have indicated will hold about 1000 pounds, and for a large apiary it will be found very useful at times.

Next look at Fig. 2. This I have marked with a scale to show the height of various parts, and it shows the lowest wall to be 8 feet high, and there are several reasons why they should be so. I have already spoken of the chimney being made large to give good draft; and to aid in this and keep the smoke from backing out at the furnace-door, especially when starting the fire, the entrance to the chimney should *never* be less than a foot higher than the top of the furnace-door, and better if it could be three or four feet. As I have this drawing, the top of the furnace-door would be about two feet up, while the bottom of the chimney is $3\frac{1}{2}$ feet.

At 5 feet I have the smoke-tight floor. When the walls are built up to this height, old boiler flues or tubes or any kind of iron that will give strength and support a floor should be laid across from the back to the center wall at intervals of 18 to 24 inches, and imbedded in the brick so that the tops of the tubes will be level or even with the bricks on top. On this lay sheet metal to cover the entire top of the chamber except the chimney. For this, cut out a corner and fit all so the metal laps over at least an inch or more on to the bricks on all the outer walls. On the inner or partition wall let it extend even with the bricks, entirely covering them—yes, better, come an inch past the brick, to be turned down at right angles. The outer walls are to be continued on up, building right on top of the iron, but this partition wall stops at this point, and the problem is to hold the iron snug down on top of this wall so smoke will not escape. Of course, the iron should be laid in mortar; and at once, before the mortar can set, small nails may be driven through the iron, right down into the bricks, using 3 or $4d$ in size. Another way would be to have several small but long bolts set into the brick when building, and let the iron be punched with holes to match and put on over these bolts; then on top of the iron a plate such as old wagon-tire, with holes also to match the bolts, may be put on and the taps adjusted.

As to what kind of sheet metal to use, it ought to be heavy—at least $\frac{1}{16}$ inch, and $\frac{1}{8}$ would be better. If one has pieces of stove metal, as cook-stove backs or bottoms, and such flat or nearly flat pieces, these may be laid on the boiler-tube joists, either matching on a joist or lapping each other until the chamber is covered; then on top of this may



ELEVATION PLAN.

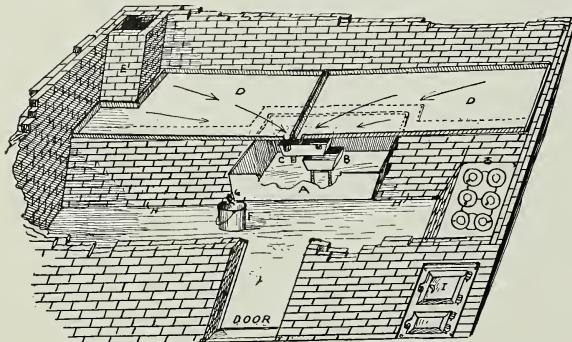
cook or heating stove the flue should never be less than six bricks around with an 8×8 opening. As for time in building, one can put up a six-brick flue *almost* as quickly as a four-brick one.

While speaking of capacity, the same principle applies to the entire machine. It never pays to run an engine up to its extreme limit of power. If you are likely to need a

be spread a covering of some kind of concrete to cover and fill all cracks. I think cement would be all right for this.

But I have gotten ahead of myself. At 4 feet is indicated a short or false floor at the furnace end—that should be put in first. Its purpose is to break and scatter the heat as it pours into this chamber from the furnace. If there is not something of the kind the heat will become so intense at this point that wax and honey will be scorched. Make this floor of boiler tubes laid close together, and covered with a concrete of some kind, or of stove or other plate metal laid on and covered with concrete. The drawing shows one foot between these two floors. Less space will do; but whatever you do, make sure to put in a good heat breaker and spreader at this point or you will have cause to repent when you have spoiled some wax and honey.

The smoke-tight floor is $1\frac{1}{2}$ feet above where the smoke enters the chimney, and here is the reason for it: The hottest air, as it comes from the furnace, pulls to the highest point. This is a principle commonly understood.



INTERIOR VIEW OF THE BUILDING.
[Unfortunately the drawing shows the structure on a slant. The reader should, of course, understand that the walls are square and plumb.—ED.]

It naturally follows, then, that there will be a layer of hot air hanging all the time against the floor, and must be more or less cooled before it starts up the chimney. It is a matter of economy in fuel, and of equalizing the heat. If I could have the furnace still lower, and the chimney entrance correspondingly lower, giving several feet of the hot-air layer, it would be much better. Do not make the mistake of building too low.

These plans are for an all-above-ground structure; but one may build over a cellar or excavate for part, but this would also require a pit for the furnace and ash-door, or else have these inside the building. The inside feed will work all right except for smoke and dust, provided you have looked well to the matter of good draft in the chimney arrangements. My present solar has two furnaces. One feeds inside and the other out. I like the latter much better.

Next come the melting-pans. These are at 7 feet—that is, higher than a man's head from the bottom or ground-floor level. A

solar is a hot place. I am describing a machine that not only melts up burr-combs and such scrap, but one that will fix all the cappings from your extractor, will melt and separate from the wax all honey in candied sections, or any combs whatever that we may wish to get the honey out of by melting or straining. But more on this point later. That tank is calculated to receive much honey, and any new combs or cappings when one is producing extracted honey can be put into the melting-pans; and as soon as the honey is liberated from the comb it runs through the separator (this will be described later), and drops into the tank, where it is perfectly safe from overheating. This tank is to be set with its top 5 feet up, or at the level of the smoke-tight floor, or nearly so—at least eight or ten inches below the outlet from the melting-pans, and to be high enough from the ground so that a five-gallon can may be set under its faucet to draw out honey. A bench or platform will be needed to stand on when loading the combs to be melted on to the melting-pans, or when stirring the refuse, or other work in the pans. One may spend quite a length of time working in the pit without much inconvenience from heat when wax is melting and running above; but a very few minutes up close to the roof would suffocate one. Just about long enough to stir the combs is all the time one would want to be there, yet he could draw off honey sitting below and be comfortable.

There may be cases where a solar could be arranged, say, on an upper floor, and have the honey run down to the room below. Or one may have the honey-tank in a cellar or pit, and also have the heating-plant there too, which would be almost an ideal arrangement if it can be so arranged. I have contemplated making just such arrangement by digging into a bank sloping south, and have a basement with the furnace and work-room and tank all below. The melting part of it only is above ground. The whole front of the basement could be glassed to give good light in it. Always have good light in any work-room.

Fig. 3 shows the separate, up-to-date, all-above-ground building as it would appear completed viewed from outside. If made lean-to style there should be but one slope. You will notice that the roof has two slopes. The south slope is glass, and not very steep. From a fourth to a third pitch is steep enough. It runs back over four feet of the structure, the rest, two feet, being roofed at about a half-pitch. This short north slope may be of tin or other metal, or may be of wood; but if shingled or boarded it should have paper or something between to prevent leakage of air. The reason for making this north slope so steep is to let the sun shine under it, which it will do in the short days, while in mid-

summer and hot weather the little shadow cast by this roof in midday does no harm, as the machine may easily be made too hot at midday. The facts are, the machine I am describing, when well constructed, can be made to do quite a little work without the

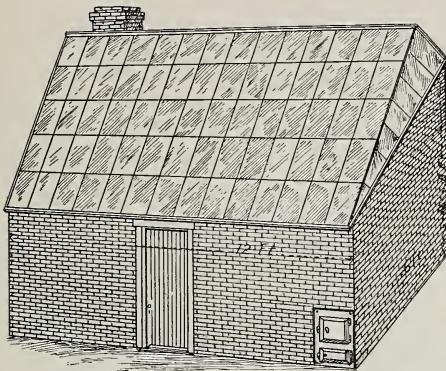


FIG. 3.—EXTERIOR VIEW OF THE LARGE SOLAR WAX-EXTRACTOR.

aid of the sun at all. It is midwinter, and I am now running my solar almost regardless of sun or even outside temperature. I have many times had wax running with a morning temperature outside close to zero, but the sun shining, and also many times have melted combs and run some wax in midwinter without sunshine. Remember what I said about capacity and effectiveness in appliances. If they will work under adverse conditions we know favorable conditions will produce wonders.

I have spoken of rendering the cappings from extracted honey. I always put these through the solar. Many people think that honey that has been through the solar is thereafter unfit for table use—that such should be sold as second or third grade honey. Well, it is said that the proof of the pudding is in the eating of it, and the same is true of honey. I have for several years been selling honey that was melted out in the solar, and the way the people smack their lips and ask for more of the same honey is proof enough that it satisfies. I can sell such honey, even though darkened somewhat, and give satisfaction, when if I ship virgin extracted that is white and not quite so thick, but such as the bee-keepers are striving for and calling No. 1 and fancy, I get complaints right along.

A few years ago I sent a paper to a meeting of the National at Buffalo, N. Y., advocating the production of extracted by having new combs built, and then cutting them out and straining the honey out. That paper raised such a *furore* that, from reports, I guess had I been there in person I should have been in danger of being mobbed. Just the same, if I had my choice of an average grade of extracted honey as put out by the fraternity in general, as against a product properly rendered in a mammoth solar, and furnace heat combined, I would choose the

latter every time, and so will the consumers in 90 cases out of 100, when it comes to a question of that which tickles the palate. The consumer does not care one snap whether the honey is amber or even dark; the taste of the article tells every time, and the matter of color is always secondary. We get to using a thing because we like it; and if we have been accustomed to eating a fine-tasting article that is even black we naturally would be suspicious of any change in color until the palate has passed judgment. Color counts in exhibitions where the eye alone must feast, and the cards warn "touch not nor handle;" but in the mouth, where taste rules, the eater never stops an instant on color.

In this region, and I think in all alfalfa and sweet-clover regions, honey tends to granulate quickly. Another thing is also true: As a rule the flows are slow, and the bees seldom have any trouble in secreting sufficient wax, and build all the comb needed as fast as they can use it; and for one time they can not supply comb fast enough, there are *many times* when there is a surplus of wax. Then also arise questions of management that make it so much easier to produce extracted than section or box honey, and with it the control of swarming, and there arises the question whether it would not be more profit to produce extracted than the other. I believe there is a great future for extracted, and that the solar, and melting to separate wax and honey, will come more and more into the problem. But that is a question by itself, and is mentioned here only incidentally to show that there is a great future for a good solar and its products of both wax and honey.

MY HONEY AND WAX SEPARATOR.

This invention of mine was illustrated and described in *GLEANINGS*, and then copied into the *American Bee Journal* several years ago; but up to the present, little more has been said about it. I do not know how many have taken advantage of it and use it. Recently J. A. Green called attention to it in these columns, and wondered why so little notice was taken of it. I here offer Mr. Green my thanks for his complimentary mention of the device; and let me assure him and all readers that the separator is not a discarded implement in my practice. I have been constantly using it since its invention, and have put tons of both honey and wax through it the past few years. I expect to increase its use. Every solar that handles the product of 100 or more colonies should have one; in fact, it is almost a necessary adjunct to every solar. It is inexpensive, simple, and a great saving implement. Here is the principle of it:

Drop a cube of wax into water and it will float and stand a trifle above the level of the water. The specific gravities of the two are nearly equal. The wax is slightly less dense than the water, so it floats. Now put the same cube into honey and it will stand about one-third its bulk above the level of the honey. I give these figures as approximate, but

they are near enough for illustration. What is true of the cube of wax is just as true of a liquid block confined in a vessel. Pour melted wax in on either water or honey in a bucket, and the wax all remains on top. But suppose the bucket has a partition in it with an opening through or under it at the bottom. If you pour honey into one compartment it flows under the partition and stands just as high in one as in the other. Now drop the cube of wax in one compartment, and immediately the honey in the other rises in bulk equal to two-thirds the bulk of the wax, and there they remain. If the cube of wax is 3 inches deep, the honey level in the other compartment will be one inch lower than the top of the wax cake. Now start a stream of honey running in where the wax is, after punching a hole in the other compartment at the honey level, and, barring a small per cent of friction, the honey will maintain its level where the wax is, and flow all day down and under the partition and up and out at the hole provided. Now make another hole in your bucket on the wax side at its level, then start a stream of liquid wax running in with the cake, and it will flow out at the hole provided for it, and continue so flowing as long as the supply continues pouring in. That is the whole philosophy of the separator.

I have used in illustration the proportion of inches; but if the honey outlet be one inch below the wax-vent you will always have in your separator a body of wax three inches deep. This is more than is necessary. I now use a separator with the wax-vent half an inch higher than the honey-vent, and this works very satisfactorily. I have never tried it, but I think even a $\frac{1}{4}$ -inch variation abundant. This would reduce the bulk of the wax very materially—a half. However, if

er run is made, so I would recommend about $\frac{1}{2}$ -inch difference in levels as most likely to give best satisfaction.

Herewith you will find an illustration of the separator I have used for several years. The levels in this vary $\frac{1}{2}$ inch. The thing is made of tin, and is 5×12 inches at the top, and about 2×10 at the bottom, and 7 inches deep. The small compartment is about 2 inches wide—less would do, as all that is necessary is a capacity to let the honey flow up as fast as it pours into the other compartment. I think half the length of this would be just about as satisfactory, and require much less remnant of honey and wax each time. The flaring shape of the pan is for two purposes: It makes it easier to remove the wax remnant, and takes less honey and wax to fill. However, there is necessarily a limit to the curtailment in size, for reasons already indicated, about sediment, and this applies more to the question of depth than width. I would not recommend less than 5 inches in depth.

Now, friends, this is a valuable implement, and effective; it not only separates the wax from the honey, but the honey passing through is in a measure strained. I set the separator over the honey-tank, and the honey overflows to the tank. The wax flows into a slightly shallower pan set beside the separator, which pan should have a little water in it. If one pan is not sufficient, it in turn can be made to overflow into another, and so at pleasure.

To be continued.

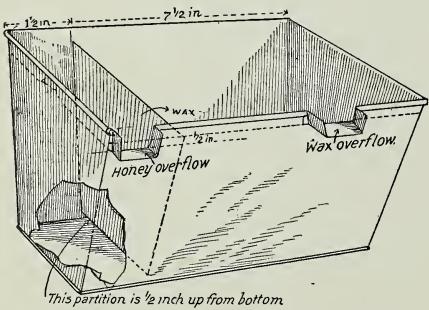
THE ALEXANDER PLAN OF BUILDING UP WEAK COLONIES.

Leaving the Weakest Colony on the Old Stand.

BY A. A. ASHLEY.

Seeing so many reports of the success and failure of the Alexander plan of treating weak colonies, I want to give my experience. I tried it on three colonies, and it proved a success with me. I think the reason some fail is because they fuss with the strong colony till they get them too thoroughly roused up. I put on the excluder, then put screen wire over that, and I set the weak colony on; twenty-four hours later, I lifted off the weak colony and quickly and gently removed the screen, then very gently set the weak colony back, and I never had a bee killed. After 30 days I separated them, leaving the weak colony on the old stand, moving the strong one to one side. This gives the weak colony the most of the flying bees. I can't tell any difference in the strength of them. One of my colonies was so weak there was scarcely a handful of bees, and they had not attempted to start any brood. I gave them a frame from the strong one. This plan is at least worth trying again, and I believe that if some of those who have failed will try again, and be a little more careful, they will succeed.

Blanket, Texas.



AIKIN'S HONEY AND WAX SEPARATOR.

very large quantities of either honey or wax are to be put through, if the variation between the levels be too slight there will be almost sure to be sediment flow over with the wax. So far as possible, all sediment should be held back on the melting-pans; but there is always some of it that goes into the separator; but it remains between the honey and the wax, and comes out with the cake of wax that hardens in the separator. This has to be removed the next morning before anoth-

GASOLINE-ENGINES IN THE APIARY.

Their Value to the Bee-keeper; How Used for Running Extractors; the Cost of Maintenance.

BY H. H. ROOT.

Extracted honey is produced on a very large scale in this country and several others. The astonishing number of bee-keepers who number their colonies by the thousand serves to show the magnitude of the industry. Many are beginning to use large extractors driven by gasoline-engines. One who is not in possession of all the facts often wonders how it can be possible that honey can be produced on so large a scale that an engine would be needed; but we can name nearly a dozen producers to-day who no longer run their extractors by hand. It is needless to say that these men have found it paid them well. Considering the first cost of the engine, however, it may be that, if the bee-keeper used this engine for no

a second of time. After new combs are in, the tightening of the driving-belt speeds up the reel in about two seconds. The extra time saved keeps the combs revolving just that much longer, which means that the cells will be left drier of honey. The fact that the work is much easier need hardly be mentioned. The breeze created by the rapidly revolving reel is sufficient to make the hottest extracting-house quite cool, which makes the work a real pleasure instead of a drudgery.

Now that the gasoline-engine has reached such a high state of perfection, small steam-outfits are almost unknown among farmers. A steam-engine with a boiler is a complicated and expensive outfit—expensive in the first cost and in the cost of maintenance. Except where as much as 30 horse-power is needed, gasoline-engines are much more

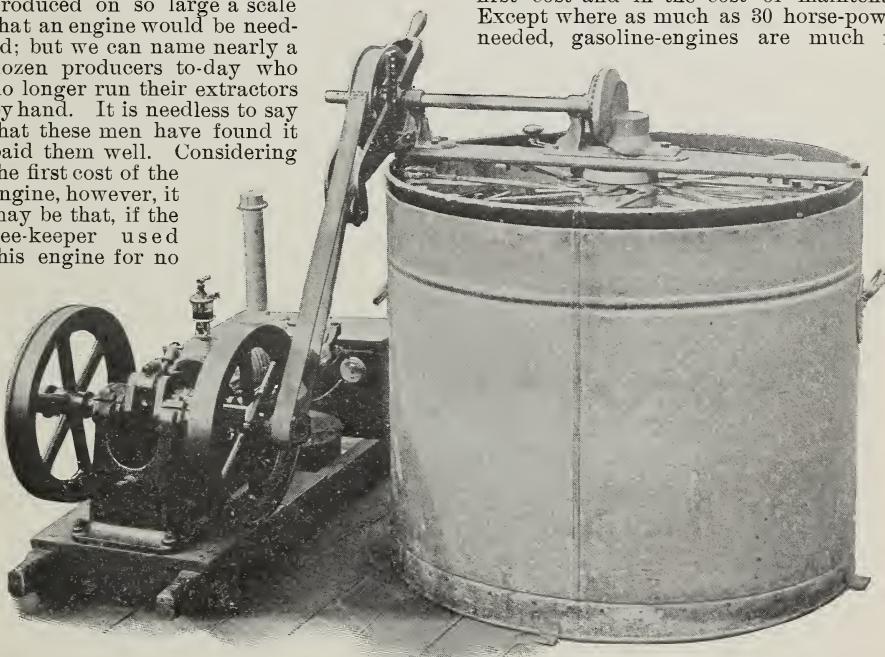


FIG. 1.—A ONE-HORSE-POWER AIR-COOLED GASOLINE-ENGINE CONNECTED TO EIGHT-FRAME EXTRACTOR.

For economy of floor space and convenience of the levers this arrangement is perhaps the best.

other purpose than to extract honey, he would be paying a pretty high price for his power; but we shall show in this article that the expense of running the engine, including gasoline, oil, and repairs, and the interest on the investment, is not nearly so great as the expense of hiring a man to do the work. But the engine may be used for many different kinds of work, so that the large producers will find that it pays many times over to buy an engine.

Cleaner work can be done with a power-driven extractor, both on account of the greater speed and because the combs can be kept revolving until the very instant that they are to be stopped, when the belt may be loosened and the brake applied, bringing the reel to a standstill in a little more than

practical. They are simpler and cheaper, easier to operate, and easier to move; and they can be much more quickly started, as there is no time lost in waiting to get up steam.

Some believe that the gasoline-engine will soon be replaced by alcohol-engines. The chances are, however, that it will be several years before alcohol will be as cheap as gasoline. But even if alcohol does come into general use, it can be used as well as gasoline in the same engine. In some cases a different carburettor will have to be substituted for mixing the fuel with the air; but even this change would be trifling, as the expense would be but a very little. For a complete discussion of the use of alcohol and gasoline in farm engines our readers are refer-

red to *Farmer's Bulletin* No. 277, which can be obtained for ten cents by addressing the Superintendent of Documents at the Government Printing Office, Washington, D. C. This also explains fully the principle on which the gasoline-engine works, and gives quite a discussion on the relative merits of steam and gasoline engines for use on the farm.

It is our opinion that internal-combustion

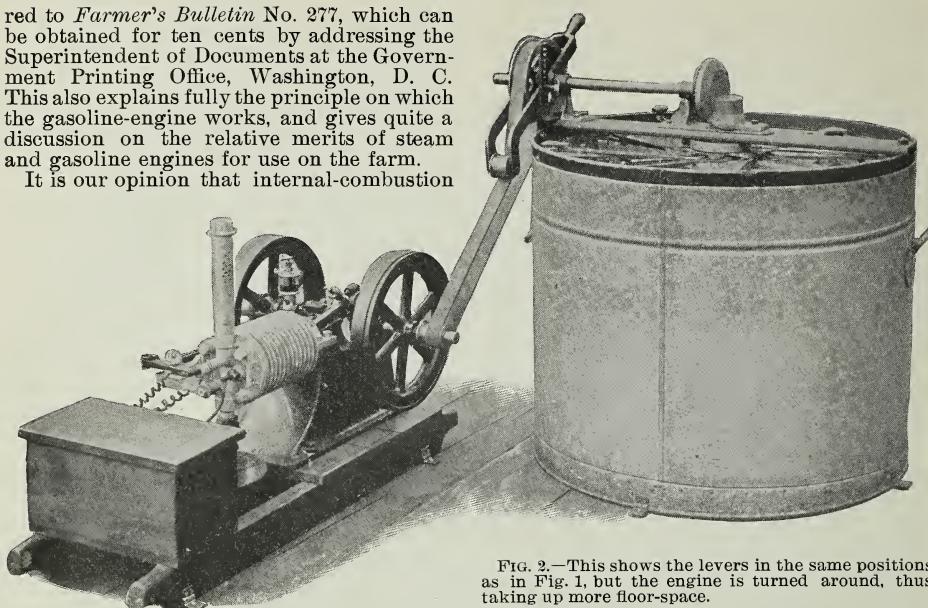


FIG. 2.—This shows the levers in the same positions as in Fig. 1, but the engine is turned around, thus taking up more floor-space.

engines using gasoline or alcohol as a fuel are becoming more popular than ever among farmers. A few years ago a gasoline-engine was considered a very unreliable source of

power; but since the advent of the automobile they have been improved upon and made so perfect that there is no reason why they should not give good service every day in

the year. It used to be a common occurrence to see a man with a gasoline-engine struggling hard and getting himself out of breath trying to make it go; but with the machines put out by factories at the present time, a failure in starting the engine and keeping it running is almost unknown unless the operator knows nothing at all about the principle or pays no attention to the very complete

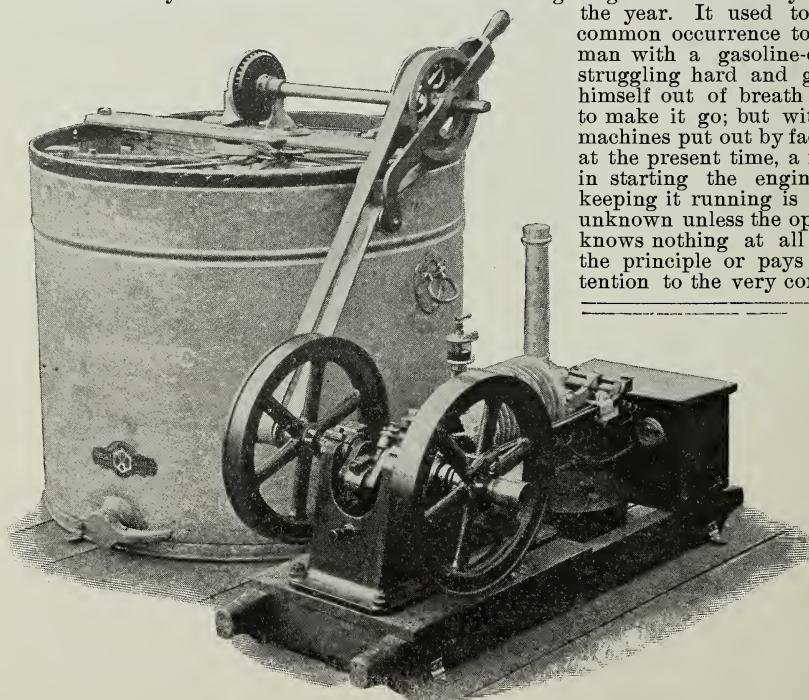


FIG. 3.—This arrangement gives economy of floor-space; but the positions of the operating-levers are not quite so convenient.

instructions that are sent out by all manufacturers of good outfits.

WHAT KIND OF ENGINE TO BUY.

This is a question that every intelligent farmer or bee keeper must decide when he is contemplating the purchase of an engine. We have spent hundreds of dollars in testing different makes of engines, and have on hand now two or three kinds which will probably never be used, simply because they are not adapted to the work required of them. We formerly were of the opinion that a very small light engine of the type used on motor bicycles would be very satisfactory for running honey-extractors; but we found that they were very delicate, and easy to get out of adjustment. Although we had no trouble in running them, yet the average person not experienced would have a good deal of trouble.

We next tried a marine engine of the two-cycle type instead of the four-cycle engines

marine engines when it is considered that the last mentioned are not ready to run, and have to be practically rebuilt when used for stationary work. Even then they are not nearly so satisfactory as an engine designed for the purpose.

We consider an air-cooled engine much the best for purposes requiring from one to two and a half horse-power, as there are no troublesome and heavy water-tanks with the attendant complications of water-pipe connections, pumps, etc. When three or more horse-power is required a water-cooled engine is a necessity.

WHAT A ONE-HORSE-POWER ENGINE CAN BE USED FOR.

Besides running honey-extractors, a one-horse-power engine can be used in many ways on the farm. They are just right for pumping water, running churning, cream-separators, feed-cutters, feed-grinders, and buzz-saws, in case the bee-keeper makes his own

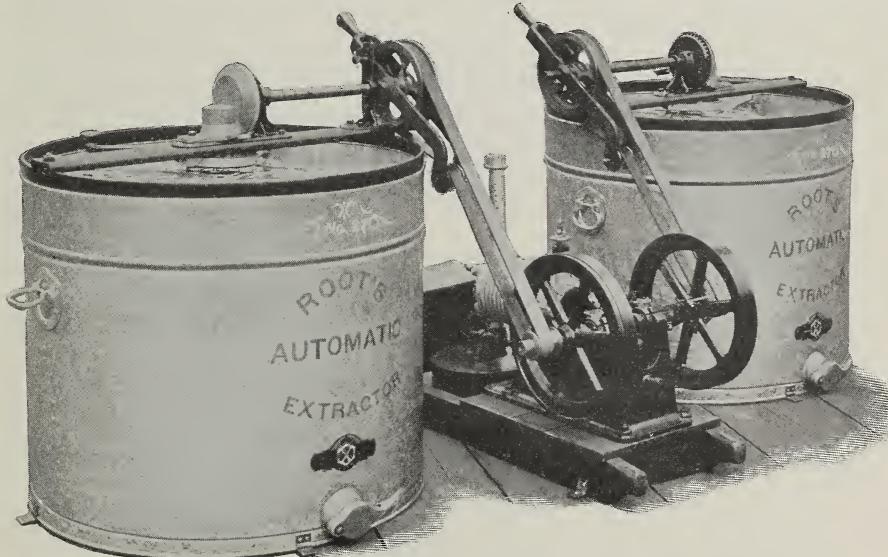


FIG. 4.—ONE ENGINE DRIVING TWO LARGE FOUR-FRAME EXTRACTORS.

which we had been using. These, in some ways, were simpler, but we found them entirely unsatisfactory for all work where the load varies. They are all right when used for propelling boats or in all cases where the load is constant. Where the load varies, small marine engines require constant attention to keep them from racing or going so slow that they stop. Furthermore, the marine motor when fitted with all the accessories, including a heavy water-tank for cooling the cylinder, is as heavy as a farm outfit. It is our opinion that it is much more satisfactory in the end to buy an engine that is intended for stationary work and for use on the farm. Such engines are sent out all set up and ready to run, and the price is not very much higher than that of the bicycle or

supplies. We tried the last mentioned and found that a two-inch oak plank could be cut with ease. Greater power would not be needed unless very heavy stuff were to be cut. Very often five-horse-power engines are used where a one-horse power would do the work easily. The one-horse-power air-cooled engine here shown weighs about 275 pounds complete, mounted on skids with all the accessories, so that it can be easily moved by two men.

We believe that, if a much lighter engine is used, there will be a great deal of trouble in keeping it running regularly. If the parts are made large, so they are not easily gotten out of order, a small boy can quickly learn to start and stop the engine and take entire charge of it.

COST OF RUNNING.

Almost every thinking man will want to know, before he buys an engine, how much gasoline and lubricating oil he will have to use; and, furthermore, what the general expense of running the

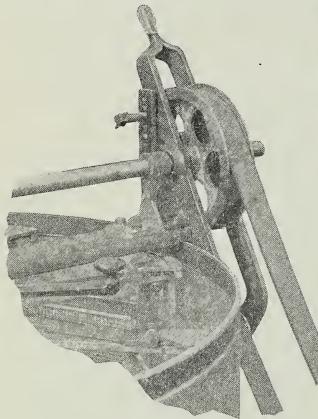


FIG. 5.—Detail of driving mechanism; the idler released and the belt loose.

engine will be. One-horse-power engines of the type here shown consume a quart of gasoline in about ten hours of constant work. If this work during the whole time crowds the engine to its full capacity, about a quart and a half will be used. The lubricating oil is a small item, as there would be no necessity of using over one cent's worth a day. The five dry batteries sent with the engine would last a year at least, unless the engine were running constantly ten hours every day, when they would have to be replaced, probably, in from two to six months. But the batteries sent with the average farm engine should last a year, for

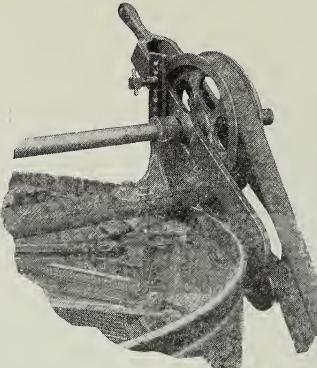


FIG. 6.—Detail of driving mechanism; the idler in position and the belt tight.

the bearings tight, etc., the repair bill would be next to nothing. It will be seen, then, that a one-horse-power engine can be operated for about 8 cts. a day.

HOW TO CONNECT THE ENGINE TO THE EXTRACTOR.

The illustrations show that we transmit power from the engine to the extractor by means of a belt which is ordinarily left loose, but which can be tightened at will by means of the idler, so that all slipping is prevented, and the extractor-reel begins to turn. Unless an old-style extractor is used in which the reversing of the comb-baskets requires a reversal of the direction in which the reel is turning, there is no reason why the reel should turn both ways, hence only one belt is necessary.

With this method of working it will be seen that the engine is

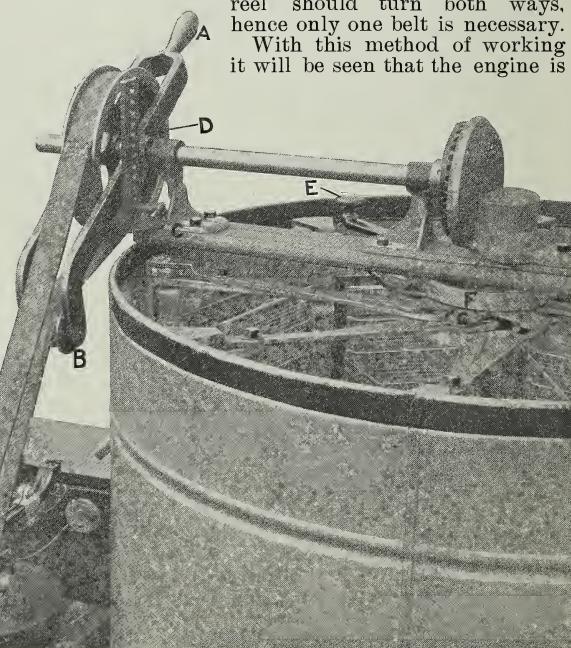


FIG. 7.—HOW TO OPERATE THE EXTRACTOR.

To start the extractor, push down on the handle A. This moves the idler, B, up, tightening the belt so that the reel begins to turn. To reverse the baskets release the idler and pull on the brake-lever, E, thus tightening the band, F, and causing the reversing-hub to move slower than the reel. This difference of speed in the motion of the hub and the reel reverses the baskets.

usually they would not be required to give service every day. New batteries can be purchased for 25 cts. apiece, making \$1.25 as the total battery expense for a year. The spark-plug should last several years; but to be on the safe side we will assume that a new one would have to be purchased at the end of the year at a cost of \$1.50. We believe that this engine will require very few repairs. If the farmer reads the instructions intelligently, and is careful to keep



FIG. 1.—F. A. LOCKHART IN HIS APIARY AT LAKE GEORGE, N. Y.

allowed to run all the time, and that the reel of the extractor is stopped by simply releasing the idler, thus loosening the belt and applying the brake. When the engine is running alone a sensitive governor cuts off practically all the gasoline and electricity, so that there is almost no waste. With this plan it is unnecessary to place the engine and extractor at any exact distance apart. They are simply placed so that, when the belt is in position on the pulleys, it has some slack. Since the idler does not need to be at any fixed position, it is obvious that it will take care of the slack in the belt unless there is altogether too much or too little.

SOME YORK-STATE BEE-KEEPERS.

F. A. Lockhart, the Queen-breeder, of Lake George.

BY D. EVERETT LYON.

About three miles from Fort William Henry, and on about 600 feet up a mountain-side, is the house of F. A. Lockhart. He is well known to the readers of GLEANINGS as a breeder of Carniolan bees as a specialty. While Italian bees of the long-tongued variety and Banat bees are reared, yet Mr. Lockhart has been best known as a careful breeder of Carniolans. Some bee-keepers have objected to this race, not alone on the ground of swarming, but also because some strains of them vary so in color. Mr. Lockhart has, by conscientious and careful breeding, pro-

duced as beautiful a type of Carniolans as I have ever seen, and I have seen them in different parts of the United States.

From 50 colonies of pure Carniolans he produced in one season over 7000 lbs. of comb honey, and had but 7 swarms out of the 50 colonies. Of course, in every colony he practiced "shook swarming," which accounts for only 7 natural swarms. This, certainly, is not a bad showing for a race of bees that have been charged with carrying the swarming impulse to extremes.

Mr. Lockhart has 700 full colonies in out-apiaries, and about 500 nuclei for rearing queens. As he does most of the work himself he says it pays him to have two nuclei in an eight-frame hive, and three or four Langstroth frames to each nucleus. This saves much time and care, as no feeding is required.

Another big advantage he finds is that they are better able to put up a fight against robbers, especially when he is doing work among them after the honey-flow has stopped. If a rare case of robbing does occur he stops it very quickly by squirting some kerosene oil about the hive entrance, with an oil-can, and in a few minutes all is at rest.

I was very much amused at the editor's account of how Quirin the queen-breeder did his work with lightning speed; but after a few days' visit with Lockhart I felt that he was in the same class with Quirin for work.

Recently, while filling a large order, Mr. Lockhart found and clipped 150 queens in three hours.

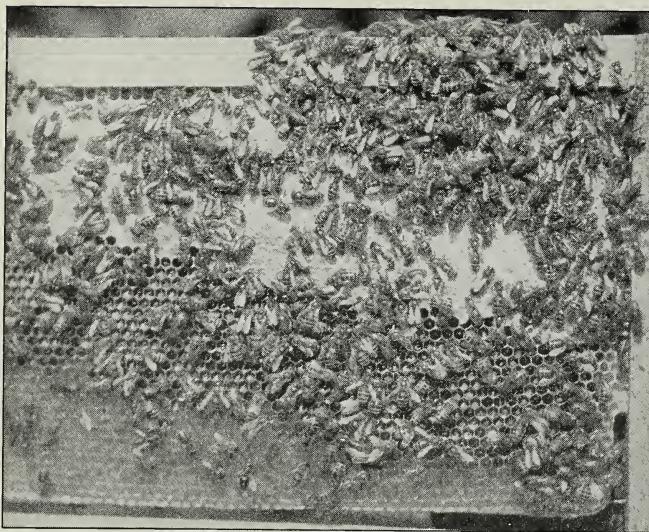


FIG. 2.—A COMB OF BANAT BEES FROM THE YARD OF F. A. LOCKHART.

I learned a little of the way he does it, and it was because he used a pair of manicuring scissors instead of the regular ones. And, by the way, this is quite an idea for those who have much clipping to do, for the curved blades of these manicuring scissors make it easy to clip a queen's wing without the slightest danger of crippling her by cutting off a leg or other part of her body.

Of the many things that interested me, none did so much as a careful study of his new race of bees, the Banats. They appear thus far to be disinclined to swarm, and it is the hardest thing in the world to get them to rear drones. As workers they seem to take first rank, and build a beautiful white comb such as is shown in the illustration. I also found them to be practically non-stinging, and as gentle (if not more so) as the Caucasians, and as I took out comb after comb I was amazed at their quietness under manipulation. They are not inclined to build burr-combs, and do not daub their frames with propolis; in fact, the nearest approach I found to it was a slight yellow stain on the edges of the frames.

I send a photo of the Banats.

The country around friend Lockhart's home is wild and picturesque, and on more than one occasion deer and bears have been seen from the house. The best bee on the place, however, is the queen-bee that presides over the home. Friend Lockhart told me with considerable glee how he had captured this queen. It seems he had an out-apiary located in a farmer's orchard; and when he drove up to it one day he was surprised to find the farmer's daughter up an apple-tree trying to capture a runaway swarm. Upon his appearance, the estimable young lady hastily clambered down, and, with many blushes, took to the house in

double-quick time. Our friend, however, was fortunate enough, some time later, to capture her, and she now presides over his home, and is the mother of his two splendid boys — Lester, five years, and Donald, two.

Mrs. Lockhart gave me the recipe for a lotion for bee stings, and one that has real merit in it. Mix equal parts of laudanum, aconite, and chloroform, and apply to the part stung, and the effect is almost immediate in the relief afforded.

The end of my visit came with much regret, for I felt it a real privilege to enjoy the hospitality of such a home, and to come into close touch with such a master in the art of queen-rearing as Mr. Lockhart is known to be. Rye, N. Y.

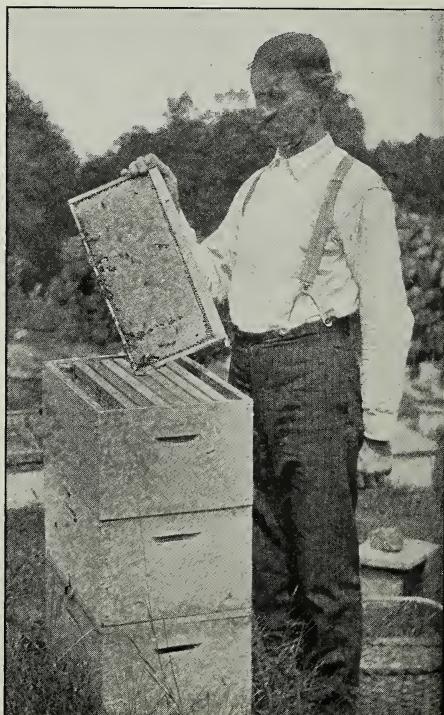


FIG. 3.—A COMB OF HONEY FROM A COLONY OF BANATS, SHOWING THE VERY WHITE CAPPINGS.

VEILS.

How to Make and Wear Them.

BY DR. C. C. MILLER.

I doubt the wisdom of going among an average lot of bees without wearing a veil. In a very hot day it is decidedly uncomfortable to have a smothered sort of feeling that a veil gives, and I may not have my veil down, but I want it ready to pull down at a moment's warning. To the beginner there's a sort of fascination about the idea of being able to say, "I never wear a veil," and even some of experience take pride in going without one when they might do better with one.

One objection to going without a veil has perhaps never presented itself to many. It is that the absence of a veil is hard on the bees. Before reading any further, stop and think whether you can give the reason why. Give it up? Well, I'll tell you. If you wear no veil, it's practically certain that you'll use a good deal more smoke than you otherwise would, and I don't believe bees enjoy having a lot of smoke blown into their eyes any more than you do.

I think I hear some one reply, "But I can work at bees without either veil or smoke." So can I; and I think it's a good way for the amateur who keeps bees for the fun of it, and has time to burn while playing with them. Indeed, I think if I should live to be an old man, with nothing else to do, I should thoroughly enjoy sitting at a hive by the hour, watching the bees at work, and manipulating their combs with such gentleness and deliberation that they would have no inclination to sting me, withdrawing from them if, on account of weather or for any other reason, they made any protest against being handled without smoke or veil. But for one who is working his bees for the money that's in it, and wants to slam through a certain amount of work in a day, whether the bees are kind or cross, it's too expensive business to move so gently that the bees think you're not moving at all.

There may come a day when we have bees so gentle and so industrious that they will store more than any bees we now have, and at the same time need neither veil nor smoke under the swiftest manipulation, but that will probably be some time after next week. For the present, barring amateurs, all bee-keepers need veils, with the exception of the man in the city close to neighbors, and he ought to be obliged to do without a veil—at least a good many of him.

Of all the veils I have tried, I like none better than the plain bag open at both ends. Get bobinet, which goes also under the name of cape net or lace net, and is about 21 inches wide. It must be black if you care to preserve your eyes, also if you care to see clearly. Soak in hot water to take out the starch. Cut a piece as long as or a little longer than the circumference of your hat-rim. Sew the two ends together, and make a hem at each end of your open bag, through which you

will run a rubber cord. The upper cord will hug the hat at the place of the hat-band. For a permanent hat and veil, it is better, instead of the rubber cord at the top, to sew the veil to the hat at the outer edge of the brim and under it. It is also better to sew a piece of white material at the bottom to make the lower hem, as the black material crooks the clothes.

Cross bees, when making an attack, fly in a horizontal line, so they do not often get under the veil, even if the rubber cord does not hold very close about the neck. Still, they do get under sometimes, and a little kink to prevent this I consider of much value. It is the invention of my good sister-in-law, Miss Emma M. Wilson. She takes a safety-pin of liberal size with which she pins the lower edge of the veil to her dress, at the middle in front. After seeing her wear her veil thus



DR. MILLER'S PALM LEAF HAT AND METHOD OF FASTENING A VEIL BY MEANS OF A RUBBER-CORD.

for some time I thought I would try it. After trying it I said to her, "I don't like your plan; it's all right while I stand straight, but when I lean over a hive the veil bags out enough to make an opening at each side above the fastening, where the bees can enter by a horizontal flight, which doesn't happen when it's not pinned down."

"You don't make it tight enough," she replied. "You must make it tight, tight."

So I stretched the cord down very tight, fastening it to one suspender-buckle, as you will see in the illustration, and, sure enough, it hugged close, no matter how much I bent over.

You will note there is no face-piece in the veil. A face-piece of tulle, a gauzy silk material (the bobinet is of cotton), is very nice, making practically no obstruction to the vision but always getting torn.

Isn't that hat a beauty? It was sent as a gift of a Cuban friend who promised to send me another when it wore out. I think he must have chuckled when he made that promise, for it looks as if it might wear a lifetime. It is of palm leaf, and so tough that, although it came through the mail done up in a tight wad, not a strand was broken.

Lest some one should have an unsatisfied curiosity regarding the figure in the background, I'll just say that's my good old Scotch mother-in-law enjoying the sunshine, while a pair of kittens in her lap are enjoying her accustomed caresses.

[Dr. Miller seems to be very much amused over something, or at least he was at the time the camera caught him with a Cuban hat on. But even if it does look outlandish, doctor, it may, nevertheless, be serviceable.
—ED.]

BEE-KEEPING IN A MONASTERY.

Being a friend of the little bees, and having built up two colonies of them this summer, I am glad to send you a photo of a swarm ready to be hived, while some of my confratres are looking on. I am keeping a few hives merely for pleasure.

Cincinnati, O. BRO. EMIL, O. F. M.

[Some time ago we had a cover-page illustration of a French Trappist monk in the act

of hiving a swarm. We also alluded to the fact that so many men belonging to the religious orders in Europe were amateur bee-keepers, and some of them experts. Evidently our American monks are not to be outdone by their transatlantic brethren, and are making a fair beginning as the illustration sent in by our friend, Bro. Emil, O. F. M., of Cincinnati, will show. It ought to be remembered these religious orders kept up the culture of bees and fruit during the Dark Ages when the rest of mankind were more intent on killing each other than on peaceful commerce and trade.—W. K. M.]

HOW ABOUT IT?

The Muscle Tissue of the Bee; is it More Efficient than That in Man? an Interesting Discussion.

BY B. C. AUTEN.

In discussing, in his articles on the anatomy of the bee, the efficiency of the muscle tissue of the bee as compared with that of man, Professor Cook, I fear, is continuing the promulgation of a fallacy, refutation of which I have never but once seen in print. It is, of course, true, as we all know, that an insect can do much more work in proportion to its size or weight than a man; but from that it by no means follows that its muscle tissue is more efficient. Various factors enter into the problem, such as the method of attachment of the muscles, and favorable or unfavorable leverage determined by the method and place of attachment. It is, however,

on the basis of relative size that I wish to discuss the subject. In doing so I shall assume that man and the bee are similar in proportions and construction, which is not the case, and will, therefore, give very inaccurate results.

According to the A B C of Bee Culture it takes about 4500 bees to weigh a pound. If we take 137 pounds as the weight of a moderate-sized man, we find him equal in weight to about 614,125 bees. As the volume varies according to the cube of the lin-



YOUNG MONKS ABOUT TO HIVE A SWARM AT A MONASTERY IN CINCINNATI.

ear dimension, we find by extracting the cube root of 614,125 that our bee should be $\frac{1}{85}$ the length of our man. If our 137-pound man be $5\frac{1}{2}$ feet tall, we find our bee $\frac{1}{4}$ inch in height, which isn't so bad.

Of any two muscles of equal quality, the strength will vary according to the area of cross-section. Areas vary according to the square of the linear dimension. The square of 85 is 7225. To recapitulate, taking the linear dimension of our bee as the unit, our bee compares with our man as follows: In height as 1 to 85; in area of cross-section as 1 to 7225; and in size, as 1 to 614,125, and the ratio of cross-section, or muscle strength, to size will be as 7225 to 614,125, or 1 to 85. That is, a man is 614,125 times as big as a bee, but his muscle area only 7225 times as great; or, in proportion to his size, his muscle area is only $\frac{1}{85}$ th that of the bee.

According to that, to show that its muscle tissue is of equal efficiency, the bee must exhibit a strength 85 times as great in proportion to its size as a man in proportion to his. If a man can carry himself, to show itself equal in muscle efficiency the bee must carry itself and 84 times its weight additional. If the man can carry a burden equal to his own weight, the bee must carry a burden equal to 169 times its own weight. If our man can pick up twice his weight, our bee must lift a weight equal to that of 254 other bees. Can it?

This is not all, either. The bee, in carrying its own weight, is under only $\frac{1}{85}$ th the muscle strain that the man is under in carrying his. A man, in carrying a burden equal to his own weight, is soon overcome by fatigue; but the bee should be able, by walking, of course, to carry indefinitely a burden equal to several times its own weight without ever learning the sensation of fatigue.

Let us look also at the matter of relative nerve efficiency. A motor center can not repeat a command until it has cognizance that the performance of the first command has begun; for example, if you wish to perform a repetition movement of lifting the finger, you can not will the finger to lift the next time until you feel it begin to lift this time. All nerve action takes a definite length of time, in proportion to the length of nerve fiber traversed. To illustrate, if you will at one instant to wink your eye and to lift your foot, your eye will be shut and open again before your foot is up; to have the movements simultaneous, you must send the command to the foot slightly in advance of that to the eye. As the length of nerve fiber in the bee is only $\frac{1}{85}$ th the length of that in the man, the bee should have 85 times the nerve activity without exhibiting any superiority.

The movement, too, of the man must pass through 85 times as much space as that of the bee, and, therefore, take 85 times as long. Nor are we through yet. The man has 614,125 times the inertia (or it might algebraically be called "momentum minus") to overcome, with only 7225 times the muscle ratio to do it, or $\frac{1}{85}$ as much in proportion;

and it will, accordingly, take him 85 times as long to get the inertia overcome as it will the bee. To recapitulate again, in man it takes a motor impulse 85 times as long to reach its destination as in the bee; it takes 85 times as long to get the movement under way, and 85 times as long to perform it, granted that the nerve and muscle function in both are of equal efficiency.

The wing movement of the bee, as is well known, is extremely rapid, and, of course, indicates high nerve activity. The movement is, however, except in its starting and stopping, automatic, or reflex; that is, it does not depend on the brain for its nerve impulse, but on a nerve center between the brain and the point where the power is applied. In vertebrate animals, the motor impulse for unconscious voluntary movements is supposed to come from the spinal cord. In the wing of the bee, the power is applied by a muscle at the base of the wing, and the distance from there to the main nerve channel of the bee must be extremely small. Moreover, the wing is extremely light in structure and in inertia. Movement, then, does not have to wait on slow nerve action, nor nerve action on slow movement. In view of all these considerations, a high rate of speed must not be considered strange.

It may be true, as alleged, that a bee has higher nerve and muscle efficiency than a man, but other data must be adduced than the simple facts that it is stronger for its size, and can repeat movements more rapidly.

One of my earliest statements herein I wish to qualify. When I had nearly finished the final transcription of this thesis, memory reverted to a book with which I was familiar when a boy, which remarked how fortunate it is for the whales that they are adapted to marine life, as it would be impossible for them to have manageable legs strong enough to support them out of water.

A VISIT TO THE GREAT CORN-GROWING REGIONS OF SOUTHWEST OHIO.

Something about Corn and Chickens.

BY A. I. ROOT.

When T. B. Terry, the great specialist on potatoes, astonished the world some thirty years ago by what he had accomplished, it not only gave a great impetus to potato-growing all over the world, but his efforts and success gave a general uplift to agriculture at large. Well, down in Butler Co., O., there is a man who has spent almost fifty years in studying and experimenting on corn. I did not know about him until I wrote up Prof. Holden's great work. A few days ago, when I happened to be down in that part of the State, I decided to accept an invitation that I received some time ago to call on Mr. Calvin S. Hunter, of Seven Mile, Ohio. Friend Hunter told me to get off at a station called North Caldwell; but the con-

ductor on the trolley line said he did not know of any such place. So I got off at Overpeck, within two and a half miles of his farm. I went into a country store and asked if there was a livery stable in the place. I was told there was none. If it had not been raining at the time I should have enjoyed the walk of $2\frac{1}{2}$ miles. While I was discuss-

am told that you live within a short distance of C. S. Hunter's place. Can you arrange to take me over there if I pay you for your trouble?"

I was a little bit surprised at the reply I got from an utter stranger. "Yes, I can take you over to Mr. Hunter's, and I shall enjoy doing so; but so far as the pay is con-



C. S. HUNTER IN ONE OF HIS CORNFIELDS.

ing about getting over there, with the loungers who sat around the stove, the storekeeper's wife remarked:

"There is a man coming in the door who lives within a mile of Mr. Hunter's place."

Said I to the new comer, "My friend, I

cerned I am paid already. I used to be a bee-keeper, and took GLEANINGS a good many years; and, if I am not mistaken, you used to be the publisher."

We were soon on the way; and as my new-found friend was a *chicken*-man, had several

incubators, and four or five hundred chickens already hatched, we forgot all about that cold rainy spell in the latter part of April.

As I looked out over the wheatfields of that region I uttered an exclamation of surprise. I knew already that that was a great wheat region; but I never in my life saw so good a stand of such strong thrifty plants as met my view that afternoon. As we went right on to friend Hunter's I did not stop to see the chickens, but promised to do so before my return next day.

Friend Hunter has a large fine country home right on top of a beautiful natural mound. You can look over his acres of cornfield extending off in every direction. While corn is the main crop, and has been for many years past, the fertility of the fields is kept up by proper rotation, something on the plan followed by Terry. The home farm has perhaps 400 acres, and one of his sons has about 600 acres more. The friend who drove me over to the place said he believed they rented some land besides on which to *grow corn*. Of course, with this tremendous acreage it would be impossible to keep up the fertility by producing or purchasing stable manure. The main reliance, if I am correct, is clover. In order to get this heavy growth of clover they grow wheat and oats; but corn is their principal crop, and oats and wheat are only a side issue.

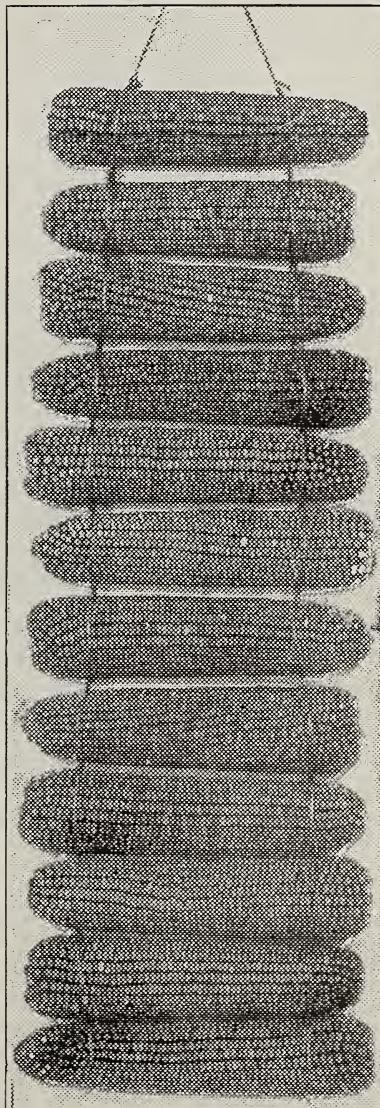
Some might say that Mr. Hunter is a lucky man in having ground so favorable for this great corn crop; but it would not be favorable without this splendid management; and another thing, I presume he selected corn, at least to some extent; because the environments left him by his ancestors were favorable for corn.

Now, I shall have to give a good deal from memory, and may be I shall get my figures wrong. If I am correct, the average corn crop for the State of Ohio is something less than 40 bushels per acre. Mr. Hunter and his sons made an average last year of over 98 bushels per acre. There were places in many of the fields where the yield was, no doubt, close to 200 bushels per acre; and repeated tests by measuring a part of some of the best rows showed at the rate of more than 240 bushels per acre. A report of this enormous yield reached the editor of the *Indiana Farmer* some time in October, 1905. He said to the students who gave him the information that if this were true he was going to see that cornfield "before he slept." He accordingly made a visit on the 27th of October, 1905, went out into the field, and measured off a part of one of the rows of corn, husked it himself, and weighed the corn himself, and the result was the astonishing figures of 247.57 bushels per acre, counting 70 lbs. to the bushel. He said in his report in the *Indiana Farmer* for Nov. 11, 1905, that there were, no doubt, places in the field that would do still better.

While I was there, one of his sons was loading up a big high-topped wagon with ears of corn to carry to market. I think the whole load would average more than 1 lb. to the

ear. The picture accompanying gives an excellent view of friend Hunter himself standing among the corn he has been so many years in developing.

Somebody said of Prof. Holden that he had succeeded in putting corn on the witness-stand, and in making the corn answer questions. Friend Hunter has been doing this, and what he has succeeded in doing with



SOME EARS OF CORN THAT ARE TO BE KEPT FOR SEED.

corn, and the particulars of the experiments he has made during the past fifty years, would make quite a book, and I have been urging him to write that book. The basket of corn in the illustration (see next page) was sent

to President Roosevelt, and Mr. Hunter received quite a nice letter from the President in return for it. Below I submit some extracts from letters that give you some information, told in Mr. Hunter's own words:

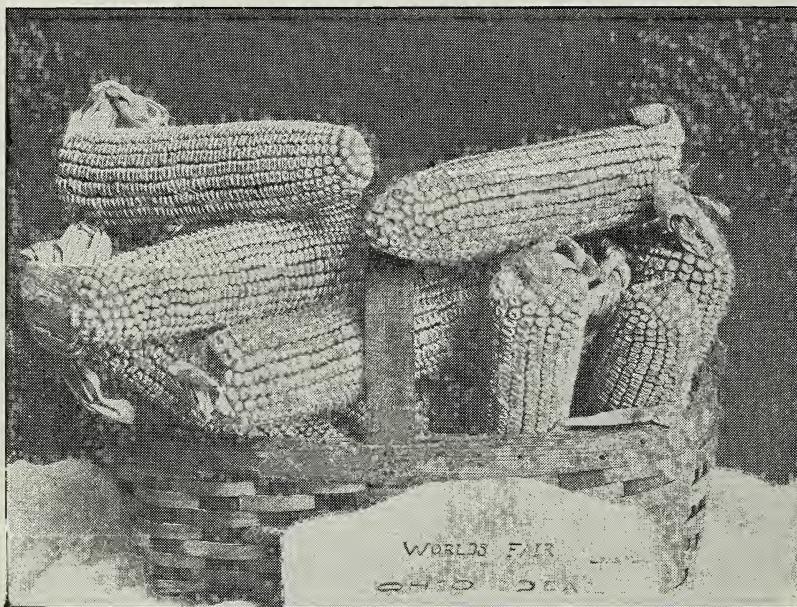
Our "Ideal" white corn (bred in line for fifty years) seems to show for itself. In 30 minutes after I had entered Agricultural Hall at St. Louis I had sold seed to Supt. Stilson, and the basket you see in the enclosed picture was ordered sent to President Roosevelt, resulting in my getting splendid letters from both the President and expert Hartley, of the "plant-industry" division. A few sheaves of fodder set up against the fence (by the experiment plots) in the Indiana State fairground two years ago brought visitors to our house from many different States. The call of A. C. Campbell and Mr. Keifer, of Brazil, Ind. (near the Illinois line) resulted in a visit from the editor of the *Indiana Farmer* (Mr. Kingsbury), an account of which may be seen in an enclosed clipping of his own paper. Our white corn was first in production at Purdue, Ind., last year—98 bushels and 56 lbs. per acre. Mr. Kingsbury came here two years ago and husked a small piece at the rate of 248 bushels per acre; also at the same rate husked by A. C. Campbell, of Brazil, Ind.; also two rods of one row husked by

are corn-growers, the poultry, like every thing else, is a side issue. I think there were something over 200 grown-up fowls; and as soon as it is light enough they scatter about in every direction.

In our walk over the fields I said, "Why, friend Hunter, your chickens reach out a quarter of a mile in every direction."

"Yes," he replied, "I think you will find them fully half a mile."

Then he pointed them out to me off over the hills, so far away I could hardly be sure they were chickens had I not seen them moving about after the men at work. You see his rich soil furnishes not only angleworms but bugs and other insects that might do positive harm were it not for the chickens that so persistently follow the plow and the cultivators. What attracted me particularly was the fact that they managed the chickens a good deal as I do mine in Florida. Instead



THE HALF-BUSHEL BASKET OF CORN THAT WAS SENT THE PRESIDENT.

Prof. C. G. Williams, of our stattion, gave 41 lbs. sound corn last fall. This is my 50th year in its cultivation.

C. S. HUNTER.

Seven Mile, Ohio.

POULTRY, AND THE PART IT PLAYS IN THE CORN BUSINESS.

At the time of my visit the skies cleared up, and in the morning I was out bright and early to look over the farm. One of the first things that attracted my attention was the large number of fine-looking healthy chickens, mostly Barred Plymouth Rocks. Besides the grown-up fowls, there were something over 100 chickens only a few days old, all raised by sitting hens. Now, the Hunter folks are great on poultry; but because they

of being cooped up or fenced up, they scatter about at their own free will. When I suggested that they might make nests where it would be a good deal of trouble to find them, he replied, "That does not do any harm. If we do not find them at all, they come off with a good-sized troop of chickens; and the first announcement we have is their marching up to the house, demanding to be fed and cared for."

But so far as the feed is concerned, I think nothing ever suffers around the Hunter home-stead from a lack of food; but in the way of shelter the hens mostly take care of themselves. I saw them trooping around when some of our scientific poultry-keepers would

think, perhaps, they would "catch their death-cold," and they did not seem to die very much either. I think Mrs. Hunter told me they gather something like six or seven dozen eggs every day. Of course, this was an estimate. When I spoke about the expense of *feed* Mr. Hunter volunteered, "Why, Mr. Root, we scarcely feed our grown-up chickens anything from along in April until freezing weather comes." This does not mean that they gather all their feed from the fields. In disposing of their hundreds (or perhaps I should say thousands) of bushels of beautiful corn, there is more or less scattered around the corn-cribs in loading and unloading; and the chickens make it a point to "gather up the fragments that nothing be lost." Some of the kernels of corn shelled from those monstrous ears seemed to me to be almost too large for a chicken to swallow unless it was some of the larger breeds.

On our way to the station we stopped to see the incubators belonging to my good friend J. A. Scott, who brought me over from the station. We first went down into the cellar where they kept the incubators. When the matter of testing the eggs came up, the daughter, who has charge of the poultry, showed me how they tested out the unfertile eggs; and I then made a discovery — something that had not occurred to me before. In order to get out the unfertile eggs (say in 3 days) before they were spoiled for table use we older people would need to get some spectacles of strong magnifying power. While the young lady detected the embryo at once, I could not see it at all with the glasses I use for every-day use.

Now, I hope that these kind friends and others where I have visited will excuse me for a little criticism. I had just been admiring friend Hunter's healthy handsome chickens *running loose* here and there and everywhere during the cool morning hours. At friend Scott's they had them housed up in brooders or brooder-houses, with lamps burning to keep them warm. Well, I have found this condition in every great poultry establishment I have visited in the Northern States. They were warming chickens up with artificial heat when it seemed to me they would be ever so much better off, happier and handsomer, if they could get warm by the heat of the sun or by running after their mothers outdoors. At Xenia I saw chickens running out in the rain, comparatively without harm, when the thermometer showed a temperature of 45 degrees. At friend Hunter's it was the same; and this morning, May 1, my Rhode Island Reds, only ten days old, were outdoors as lively as crickets when it was cloudy, and the thermometer was down to 40. Of course, the mother warmed them up once in a while. Friend Scott explained that his four or five hundred chickens would have been outdoors on the morning of my visit had it not been for the fact that they had not got their poultry-netting up around the yards so they could let them outside without getting mixed up.

Friend Hunter is a jovial man, as you

may gather from his looks. Every little while he was getting off some of his jokes. When I said I felt that I must get around to see some of those wheat-fields during the harvest-time he replied, with great gravity, "Mr. Root, you certainly *ought* to come, for it is indeed at times a *shocking sight*." At another time he put his finger on a piece of poultry-netting and said, "When testing these ears of seed corn, just cut out a piece of poultry-netting and lay it on top of your box of dirt, then you take the six grains from each ear of corn and put them inside of one of the meshes of poultry-netting."

Then he added, "Now here is another short cut for you chicken-men."

As he said this he turned to his neighbor Scott with a comical look, "You want to get a good post-auger and dig a deep hole somewhere near your brooder. Cover it with a round board or something of the kind. When you find a dead chicken just drop it in this deep hole and put on the cover. It is less trouble than to dig a place to bury the chickens one by one as fast as they die."

This last suggestion hit me in a spot where I felt a little sore, for there was one time in Florida when I found it quite a little task to dig so many "burying-places" for each dead chicken. Mine did not have any disease, however. I had no losses except those that were induced by the coal-oil lamp of that chick-brooder I told you about. Perhaps I am taking a big responsibility on myself, especially while I know so little about modern poultry-keeping, to undertake to criticise those who raise chickens by the thousand; but I can not help thinking, again and again, that more *people* and *chickens* are killed by warmed-up houses and artificial heat than because of exposure to the weather and a lack of protection. Of course, we want to keep warm—chickens as well as people; and old chickens as well as old people, perhaps, should avoid being chilled—that is, chilled in a harmful way. But I think we both need to beware how we try to substitute artificial heat for sunshine, outdoor air, and exercise.

Before closing let me get back to the corn once more. On page 45 of our issue for Jan. 1 I told you how our station was getting a strain of corn that would not blow down during high winds. Well, Mr. Hunter has been working along the same line. But he adds something like this: "It is true we can produce a strain of corn with stalks so strong that they will stand ordinary blows; and this very thing illustrates something we have met in developing desirable traits in corn or any other plant. We got a strong stalk, it is true; but it is more or less at the expense of the ear of corn. If you wish to grow fodder, get a big strong stalk with little or no ears; but for grain the strong stalks must not be pushed too far. A strain of corn that produces a good-sized ear, not too high up from the ground, and an ear that soon turns over and hangs down by its own weight, with a reasonably strong stalk to support it, is what we want rather than to lay so much stress in our experiments in

getting a crop that will not break down or blow over during heavy rainstorms."

SOMETHING STILL LATER FROM CALVIN S. HUNTER.

We got two fields planted in April, and our testing-boxes show the seed to be good. The three old strawberry-boxes (covered by frames of chicken-wire of 2-inch mesh) will test 264 ears of corn at one setting (enough seed for 25 acres). Each twine suspends the number of ears that fill one row of the meshes, and is tagged at its loop for its number or row in its box, always counting the ears from the bottom one up to the loop by which they are hung up to dry or season.

I fill our testing-boxes more than full of garden soil, so it may settle and yet the wires fit snugly on the surface; then I push each grain *point* down (and deep) so as to economize space, the two butt grains in the center of the *block*, so as to waste only the point of the ear, if that is *all* that is bad. I have a grain with two hearts, or germs, and to me it is as rare as to see grains on the inside of an open cob, which I have seen. This two-heart grain would make a suitable wedding-present. C. S. HUNTER.

a suitable wedding-present. C. S. HUNTER.
Seven Mile, Ohio, May 2.

A SEASON'S WORK WITH SECTIONAL HIVES.

Swarm Control and Comb-honey Production.

BY J. E. HAND.

[This is the beginning of the promised series of articles by Mr. J. E. Hand, on the general subject of comb-honey production and swarm control in localities where the honey season is short, and where, generally, no surplus can be secured with ordinary management and appliances.

Our friend has been saying for a year or two back that he had a system of management, in connection with the divisible-brood-chamber hive, which not only brings swarming under control, but secures for him extra fancy comb honey. We did not think very much about the matter, as there are not a few (good bee-men, too) who sometimes become so over-enthusiastic over some method of management that they have developed that they come to the conclusion there is no other plan to equal it. We were finally induced to look into Mr. Hand's method. Indeed, he made a trip to Medina to explain it. We called together a coterie of our men. At first we were really sorry for him; then we became interested; finally enthusiastic. While we did not lose our head (at least, we hope so) we will say this much: Mr. Hand has perfected a system which will merit the closest and most careful scrutiny of those comb-honey producers who have been annoyed by the swarming problem, and who have been unable, owing to the shortness of the season, to secure a paying crop of comb honey.

The result of our interview was that we made arrangements with Mr. Hand to write us a series of articles detailing his method, describing how he works with the Heddon divisible-brood-chamber hive as he has modified it. These articles we now have in hand, and we expect to send a member of our editorial staff to his place to-morrow with a set of cameras to photograph each step and detail of this method. We hope, therefore, in succeeding issues, to place before our readers something of more than ordinary interest.

We may say further that we have talked with a number of divisible-brood-chamber experts since that time, and have been surprised to note the remarkable agreement among them as to the possibilities in the handling of this hive.—ED.]

That swarming is the most serious obstacle in the pathway of successful comb-honey production on a large scale is evident from the fact that, notwithstanding there is an almost unlimited demand for a fancy article of comb honey at a high price, nearly all the large apiaries are engaged in the production of extracted honey, which brings less than half what it would if stored in the form of section honey.

In a series of articles which I have prom-

ised to give to the readers of this journal, of which this is the beginning, I will endeavor to tell, in a clear and concise manner, just how very nearly, if not quite, as many pounds of comb honey can be produced as of extracted, and with no more trouble from swarming than in the production of extracted honey. That there is need of such a system, all producers of comb honey will agree.

It is true that shook swarming, with its many variations, is better than nothing; but it is only a partial success at best, in that, like natural swarming, the strength of the colony is being continually reduced by the dropping off of old bees while no young ones are hatching out to take their places, and the colony soon becomes perceptibly weakened right in the midst of the honey-flow, which means a loss to the honey-producer. Hence it is very desirable to have a system that will keep the brood and bees together, thus keeping up the full working force of the colony for any length of honey-flow that may come.

These articles will tell you, not only how to do this, but how you can have every one of your colonies just boiling over with bees, so that you can take advantage of any honey-flow that may come, however early. They will show you all the advantages of the two-queen system as applied to comb-honey production and swarm control. They will tell you of a new method of putting foundation in sections, four at a time, in such a manner as to insure a perfect section of honey firmly fastened on four sides, and practically free from pop-holes in the corners, which means that practically all your honey will be fancy.

I will begin in early spring, taking the reader right along with me throughout the entire season. We will clip queens, unite colonies, and, in fact, carry on all the necessary manipulations with lightning rapidity, and yet not hurry, for all our manipulations will be by hives; not a single brood-frame will be removed during the entire season, thus proving to your entire satisfaction that the handling of brood-frames singly is indeed an expensive luxury.

HIVES.

While it is true that hives do not gather honey, and that, other things being equal, a colony of bees will store as much honey in one hive as in another, it is no less true that our success or failure in the production of surplus comb honey and swarm control depends upon the principles involved in the construction of our hives to a greater degree than on any other one thing.

That the advocates of large fixed-brood-chamber hives are the ones who are calling loudest for a system of swarm control, is a significant fact.

To the user of these hives, swarming is indeed a calamity; for with the issuing of a swarm vanishes all their hopes of a crop of surplus comb honey, since a swarm hived in one of these large brood-chambers would not enter the sections unless the honey-flow were of long duration.

The fact that these large brood-chambers only delay swarming, and do not prevent it, makes the matter still worse. It were far better if they had swarmed before they had begun work in the supers, for now the user of these hives finds himself in possession of a lot of partly filled sections from which to extract the honey, since his hive is no better suited to feeding back to have them finished than it is for hiving swarms.

That there are locations so good that even these large fixed-brood-chamber hives will give good results in comb-honey production, I am free to admit. It is no less true, however, that there are hundreds of locations, including my own, where it would be impossible to produce comb honey with such a hive. Many of us are compelled to meet changed conditions; and where, a few years ago, there was an abundance of basswood timber, to-day such timber is scarce and is growing painfully less each year; and, owing to intensive farming, our one-time bee-pasture is now under the plow, and the producer of comb honey is compelled to adopt an improved system—one that will enable him to take advantage of a very short honey-flow and get all the honey in the sections, or else go out of the business and produce extracted honey, as many have been compelled to do in my vicinity. All this has a tendency to create a better demand for comb honey; and the bee-keeper who can produce it will find a ready market at a good round price. It is just as easy to produce comb honey as extracted if you know how.

SWARMING—WHAT IS IT?

Swarming is nature's plan for the perpetuation of the existence of the honey-bee, and is governed by certain laws which, to break, would often result in the complete destruction of the swarm. If this were not the case, and if bees could swarm at will, there would not be a colony of bees in existence to-day. Bees are intricate machines, and it is the height of folly for any one to expect to be able to solve the perplexing problems of successful apiculture without a correct knowledge of the nature and instincts of the bees, and also of the forces that control their acts; for if the diagnosis is wrong the medicine must of necessity be wrong; and, instead of effecting a cure, will only aggravate the disease.

There are two forces that govern or control the act of swarming. One is external, and is a combination of natural influences, all of which may be controlled by man; however, external influences could not compel the issuing of a natural swarm of bees without the coöperating power of the internal force, which is instinct; and, on the other hand, even though all preparations have been made for the issuing of a swarm, if the external pressure is suddenly withdrawn the combination is broken up and the bees will not swarm, although queen-cells are well under way. A certain law forbids it without the coöperation of the external influences.

Therefore the issuing of a natural swarm of bees is the result of united and harmonious

action on the part of both the external and internal influences.

HOW CAN WE PREVENT SWARMING? INSTINCTS OF BEES ALWAYS THE SAME.

Every effect has its preceding cause, and the same causes will produce swarming irrespective of location. The word *locality* is becoming too often used to cover a multitude of extravagant claims. We should bear in mind, however, that, in solving the problem of swarm control, we are not dealing simply with the little bee, that we may easily crush between thumb and finger, but with nature, which neither time nor location can ever change. Instincts first implanted by the hand of the Creator have passed through centuries of time unimpaired to the present day, and will continue unchanged through all future time, notwithstanding all talk about breeding out the swarming impulse—as well try to breed a drone to lay eggs!

Man can not destroy nature, yet he may and does in a thousand different ways defeat her plans by removing the causes which she uses to bring about certain results. This is the key to the problem of *perfect swarm control*, and will be fully demonstrated further along in our season's work in the apiary.

Although you have the key to the problem, yet, unless the principles involved in the construction of your hives will admit of the manipulations necessary to enable you to keep the brood-chamber clear of honey, you are not yet master of the situation.

Birmingham, Ohio.



THE TOAD THAT WOULD NOT TAKE A BLUFF.

Last year a big fat motherly-looking toad established her domicile under one of my Danzenbaker hives at the back of the apiary—no objection to that. In the evening, just after the sun went down, I would sit out there watching the late-returning bees as they struggled into the entrance. Where the old-style bottom-board was used, many bees fell short, and some were unable to get in. They would try to climb in, and then would rest awhile and try again. They seemed to tell me that that was their last load, and if they could only deliver that safely they would be willing to die. I could never see a bee trying that but that I always helped it in.

Where the wide alighting-board was used they had no trouble. One evening, as I sat there with the musical hum of the bees in my ear, out came my friend, the toad. Around she hopped, lapping up flies, bugs, and sometimes accidentally a straw or stick. The lat-

ter she would claw out of her mouth with a front foot. At last she happened in front of a hive-entrance, and saw the bees pouring in. She stopped and craned her neck. Did you ever know that a toad had a neck before? Well, you should have seen that one. She hopped right up to the entrance; and as a bee made a fumble at getting in, that toad just swallowed it without even being near it. At first I thought the toad could not reach, as it made a sort of awkward jump and then stopped as if she had changed her mind. But the bee always disappeared. I watched this for some time as the toad stood there and actually reached right into the entrance with that great long tongue and got a bee every time.

Now, this toad and I had gotten along pretty well up to this time; but the thought that any animal could have such contempt for my little fighters as actually to eat them and then wink merrily as if they tasted good! This was too much for me to look at and remain neutral; so I thought that, perhaps, I might teach that toad a lesson. I caught it, tied a string to one of its legs, held it down in front of the hive-entrance, and gave the hive a jar. The bees came out to see what was wanted; and as the toad began to kick they fell to with a vengeance. They covered it all over and left their stings so thick that it looked more like a Texas toad than any thing else. I got so interested in watching how the bees had the laugh on the toad that I got close up on the firing-line. The bees thought they would see if it would do any more good if they stung me some. This brought better results, for I dropped the string and vamo-sed. I thought the toad had gotten her finish; but not a bit of it. Next evening there it was with the dried-up stings still in the tough hide.

She could actually jump further, stretch her neck longer, and seemed to have a "longer tongue-reach." I took hold of the string, swung it around over my head, and her Wartship landed in the blackberry bushes about 50 feet away. Next morning I looked under the hive and there she was, trying to hide her face with her hands. I put her in a sack and took her to a swamp about a mile away. I think we are shut of her, for this was last summer, and she is not back yet.

A toad one day was feeling bad,
Her mind somewhat erratic;
And then her limbs were sorter stiff,
A little bit rheumatic.

She got into a hive of bees—
That, surely, did the biz;
And goes to prove that all bee-stings
Will cure the rheumatiz.

Special emphasis to be placed on the "tiz." I have overcome some of my bad habits, but the poetry habit is chronic. Just been in consultation with my physician about it, and he said it was caused by acute cerebral disintegration. The remedy he usually recommended was plenty of air, but said I had too much of that already. Oh, my!



HOW TO KILL THE COMB-HONEY LIE, AND WIN A CUSTOMER.

I have made a trip every year for ten years to the upper peninsula of Michigan, selling comb honey. I don't have any trouble with the person who believes there is manufactured comb, and knows all about it. I just keep my temper; and if that person gets abusive or ungentlemanly, all the better. When the reaction comes, and it surely will, he will buy a case of honey. The best and only argument worth any thing with one who knows so much is the \$1000 reward offered by A. I. Root for one pound of manufactured comb honey. They won't believe that, of course. Then I say, "Friend, I will give you \$500 for one or more pounds of manufactured comb honey that the bees did not make, and I am ready now to give you any reasonable security for making my promise good." Be courteous and gentlemanly first, last, and all the time. The customer finally thinks that, perhaps, your honey is the real bee honey, and guesses he will take a case. The next year he doesn't stop to argue, but says he has been waiting, for yours is surely pure honey. Of course, he won't admit it; but if you could hear him talk with his friends you would hear him say he doesn't believe there is such a thing as manufactured comb honey after all.

Mt. Pleasant, Mich. H. G. WHEELER.

[There is another strong argument that you can *now* advance, viz.: that the national pure-food law, even if it were mechanically possible to manufacture comb honey, would effectually bar the product from the markets. No one would dare sell it, for the moment it left the borders of the State of its alleged manufacture there would be trouble.—ED.]

A NEWLY FORMED NUCLEUS LEAVES HIVE.

In the forenoon of June 13th I took five empty combs—four full and one partly built out—and put them in a box with wire-cloth bottom and a one-inch auger-hole for entrance, as Swarthmore describes in his book "Increase." There was some honey in the combs. Then I shook in four frames of bees from a strong colony, and carried them into the cellar and let them stand there for seven hours; then I nearly dug out the candy in the candy-hole of a cage containing a new queen I had just reared, and put the cage on top of the five frames, as there was $\frac{1}{4}$ -inch space between frames and cover. I then carried the box and bees two miles away from home, set them in the shade on the north side of a tree, and opened the flight-hole.

Well, in the evening of the fourth day I went over to bring the bees and queen home, and you can well imagine my surprise and dismay on finding that the queen and bees had taken French leave, or swarmed out. The bees had started to build some comb in the frame that was partly built out, and the queen had laid a few eggs, but probably she was not sufficiently fertilized, and tried to go out and find some drones; but there were none around there. I think I was foolish for not clipping her wing.

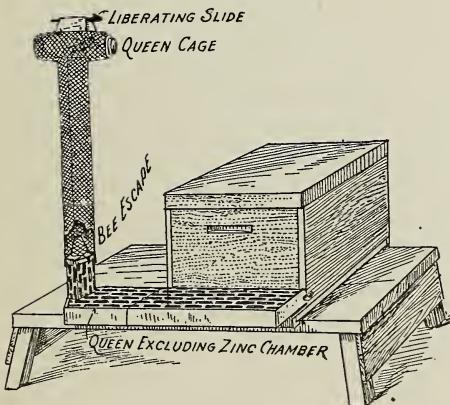
Deerwood, Minn. G. H. PETERSON.

[Ordinarily the bees would have stayed all right without swarming out; but it would have been better to clip the queen's wing, and, in addition, given the bees a frame of unsealed brood.—ED.]

AN AUTOMATIC SWARM-CATCHER.

I send you a drawing of an automatic swarm-catcher, of which I desire your opinion as to whether it would be practical and efficient. The tube and cage are made of fine wire screen, which prevents the bees from killing the queen on finding that she can not leave with them, and the rest is made of perforated zinc. WILLIAM BACON.

Burt, Iowa.



[Your plan would probably catch the swarm; but a far cheaper plan would be an Alley trap. Bees very seldom if ever kill a queen in an Alley trap. After making one or more fruitless attempts to swarm they may supersede her in the hive. Your device would be no better than the Alley trap, and cost more.—ED.]

PAINT FOR HIVES MADE OF OIL AND PORTLAND CEMENT.

I paint the covers of my hives too, with three coats of boiled oil and Portland cement. It hardens like stone, and the covers do not leak. I have some covers and hives that were painted this way 13 years ago, and they are good to-day.

Mix like paint. The last coat is sprinkled with cement. Rub it in with the hands.

Tully, N. Y. J. W. TURFF.

[Such paint is excellent, as we know from tests.—ED.]

A QUESTION CONCERNING INCREASE.

Does it set a strong colony working well in supers now to take two frames of hatched brood from them and give full sheets of foundation in return, the same brood being used for increase? Would you advise me to take one colony and divide it up in four nuclei rather than take a little from hives over my apiary?

E. D. RUSSELL, M. D.

Clare, Iowa.

[There would be nothing in particular gained, but something lost, by taking away two frames of hatching brood. A colony, to work in a super, should have a large force of bees; and while young bees can not for some days go to the fields, they serve to keep up the necessary animal heat of the colony for comb-building.

Better by far make your four nuclei out of one colony than to take a few bees from many colonies, thus reducing the strength of all of them in proportion to the number of bees taken from them.—ED.]

FEEDING OUTDOORS TO STOP ROBBING.

It is with much pleasure I read the article from the pen of Mr. Wm. McEvoy, and your comments thereon, in current No. 8 of GLEANINGS—especially that portion referring to feeding bees outside the hive. I am delighted to hear some one who is regarded as authority on subjects about which he talks, say that robbing can be stopped by feeding outside. Feeding has been practiced by me in the yard, not ten feet away from the hives, to prevent robbing; but there has been so much said against the practice of feeding outdoors that I've been afraid to mention the fact that it has been my practice for at least ten years, fearing I might get a sharp pen, or something else sharp, jabbed at me. My first experience was immediately after reading a very authoritative article against the practice. You know I am curious to know if these things are so, consequently do some experimenting, though it may be risky sometimes. I have found out a lot of things myself by so doing, and think then I know that sometimes they are not so.

Lake Geneva, Wis. WM. M. WHITNEY.

[Orthodoxy does not even yet recognize the possibilities of outdoor feeding to stop or prevent robbing; but it will some day, especially when such old wheel-horses as Boardman, McEvoy, Whitney, as well as some others, vouch for it. For extracting after the season it will prove a great boon.—ED.]

ALEXANDER PLAN FOR WEAK COLONIES.

I tried Mr. Alexander's plan of strengthening weak colonies by placing them over strong ones and failed completely. I feel sure the fault lay in not placing something between to prevent their killing each other. I think I will try it once more, putting screen wire between and making an opening above for the upper colony.

R. C. MORRISON.

Rutherfordton, N. C.



"And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it.—*GENESIS 1:28.*

For of such is the kingdom of heaven.—*MATT. 19:14.*

On my return from Florida I met Mrs. Root at the home of our youngest daughter in New York city, and we passed a week very pleasantly in studying the great metropolis. It was not exactly the kind of "nature study" that I have been telling you all about on my Florida island, for we studied *humanity*, at least a part of the time, rather more than chickens. Among other things, we took an automobile trip around the city, and listened meanwhile to a megaphone lecture. We passed the residence of Mrs. Russell Sage, Mrs. Hettie Green, and various other celebrated personages. The "lecturer" seemed to give special attention to the homes of millionaires. I remember he said in one place something like this:

"Gentlemen and ladies, the man who lives over there had so much trouble with his wife that he gave her two million dollars to vacate and get out of his way. But after he got rid of her he invited her to come back, and he let her keep the two million dollars too."

Now, I can not just tell whether it was the lecturer or somebody else who intimated that this multi-millionaire had got his eye on a young actress, but the good wife stood in the way. When he found, however, that this actress was not impressed by his millions as he had calculated, he was glad to get his lawful wife back again.

Owing to my deafness I could not catch all the talk, especially as most of it was given while we were going at a rapid rate. But I caught something like this: The speaker, swinging his hand over a certain part of the city, said, "Over in this section there are sixteen babies born every minute." Then he named another part of the city—I am sorry I can not give it—where, he said, there were only sixteen babies born in a *whole year*. I presume the "sixteen every minute" referred to some regions densely populated by the lower classes of emigrants and foreigners. The other location was probably among the millionaire people and well-to-do folks, and I greatly fear, dear friends, it is beginning to apply to our educated, intelligent, fairly well-to-do men and women.

You who have known me longest are perhaps well aware that I rejoice to see young people get married; and it pains my heart to see any man or woman, especially gifted and talented men and women, when they get along to 25 or 30, seem to be making no plans for the building-up of a home. Now,

after these young people get married I still feel anxious in regard to their future welfare and future value to humanity in general, until I see some little ones coming to that home, provided it is such a home as God designed every home should be from the foundation of the world; and I propose, dear friends, to consider in my talk to-day some of the obstacles that stand in the way of the making of American homes. I have already considered the objections to getting married, but I will go over them briefly here. One of them is that young people can not afford it; that the young man is not getting sufficient salary, etc. When Mrs. Root and I had decided that we would work together side by side, this question came up. I think it was \$3.50 a week that I was paying for my board. Well, with this \$3.50 she provided the table for us both and had something left. Mrs. Root is a worker, as you may happen to know. She was a worker when she was a girl; and although she is now well along toward 70 she is a pretty lively worker yet. Our fathers and mothers were none of them well to do, but they managed to give us a few things to start the home; and Mrs. Root gave me better fare than I ever got at any boarding-house, and had something left, to say nothing about the fun *we two* had every day of our lives. Of course, there was a little bit of a cloud over us when we first had intimation that a little prattler was coming to stay with us a little *earlier* than we had planned; and when another and another came along, I fear, perhaps, there was some murmuring. But, dear me! how difficult it was to learn that God's plans were very much wiser and better than ours! Had it not been for the five little Prattlers that came along, one after the other, how could I have gone up to Michigan and started a peach-orchard, or gone down to Florida when bleak weather came, and played with my chickens all day long? Young people, when they start out in life, seldom think of these things; but, my dear young friends, how in the world are you going to *keep* young to the end of your days, and enjoy life up to a good old age, unless you have not only children but *grandchildren* as well to take up life's duties and give you a respite and vacation in due time, to say nothing of making things lively and full of life all around the neighborhood?

Perhaps the getting married part of it can be got along with; but I am told that the obstacles are multiplying against having *children* in the home. Our youngest daughter has one of the most convenient homes—that is, convenient for making it easy and pleasant for housework—that it has ever been my good fortune or that of Mrs. Root to see. They live in one of the New York apartment houses or flats. There are no cottages in New York, with their vine-covered porches and pretty little dooryards. Although Mr. Boyden, our son-in-law, went 13 miles away from his office out in the suburbs to find a place where apartments were reasonably cheap, about the only thing they could do

was to get some third-floor rooms in a flat. But these rooms are most beautifully arranged for the housekeeper. There is hot water, both in the kitchen and in the bathroom. There are hot-water radiators, nice large windows so you can have sunshine as well as outdoor air; and there is a dumb waiter to bring up every commodity close to or into the kitchen. Men come around regularly to take away your waste in the kitchen, and other men deliver ice, bread, groceries, etc. All the appliances are so handy that every thing may be kept scrupulously clean with the least amount of labor, and the whole thing seems to be ideal for a young couple—*with no children*. The people who own the apartment houses do not want families; and, if I am correct about it, they do not seem to want any babies around. It is out of the fashion. May be I am wrong about this. I hope so. This same lecturer on the automobile informed us that in many parts of the city the occupants owned the apartments where they lived; and many of these apartment houses go up many stories. You see it does not make very much difference whether you are high or low. The elevators and appliances furnish almost every convenience to those up in the upper stories that they have in the lower ones.

Our last and most serious obstacle in the way of raising families seems to be a growing fashion among hired help to find places where there are no children. Our agricultural papers are now discussing, and have been for several years past, not only the difficulty but the impossibility of getting competent help on the farm, for any thing near such prices as the average farmer can afford to pay. Now, of late the trouble in getting competent help for the mother of the home seems to be still more difficult. I am told that, while wages are constantly increasing, the quality of the help in the market is constantly decreasing. If the mother of the home is sick you can probably get a hired nurse by paying her three or four dollars a day and her board. But this hired nurse gives you to understand very quickly that she is not to do housework, cooking, washing, nor any thing of the kind. When you get a hired nurse you must also get a hired girl to cook for this nurse and the rest of the family. Then this hired girl will give you to understand very soon that she is not to do the washing. When washday comes you must hire a wash-woman; and when housecleaning time comes you must hire still another woman to clean house; and in some places they not only hire a woman to clean house, but they get two women, for it is too hard work for one woman to do the necessary lifting, etc. And to be right up to date you must also get a man to come and whip the carpet—a professional carpet-whipper. When I talk about the revolt or rebellion against these modern innovations they tell me, "Oh! you have *got* to do it. Things are different now from what they used to be." Do they need to be so different? Do we need so much house? By the

way, there is a little hymn that commences something like this:

Oh to be nothing, nothing,
Only to lie at his feet!

A few days ago it was my good fortune to have a chance to talk this over with the wife of a prominent minister. They have several beautiful children in their home. A minister's wife has no end of demand on her time that most other women know little about, especially if her husband is pastor over a congregation of several hundred. The lady knew all about—I was going to say the hired-girl problem; but I do not like to say "hired girl." Why not say help for the mother? The minister's wife, especially such a sweet-tempered devoted Christian woman as this one of whom I am speaking, would be expected to get along with any help that is half way decent; but just at the time of our talk the "help for the mother" was on the eve of going away. Said I, have you somebody else in view?"

She shook her head.

"Well, now," I continued, "may I ask what you propose to do if you do not succeed in getting somebody?"

She gave me a bright pleasant smile—yes, it was a happy smile full of faith and hope and energy—and said she was going to do the work herself. Of course her bright, energetic, and talented husband will stand by her side and relieve her of a great lot of hard work. (One may wonder if this is exactly the thing for a high-priced minister to do.) I said right here (in fact, I have said it before to Mrs. Root and her grown-up daughters) that we must be careful about worrying or borrowing too much trouble over this matter of hired help. Said I, "I am sure, dear friends, that in all this difficulty God is striving to teach us wholesome lessons—lessons that we need. We want to remember the first and second lines of that little hymn that we all know so well, or ought to know:

Have you trials and temptations,
Is there trouble anywhere?

Take all these troubles about hired help and every thing else—no matter whether on the farm or in the home—"take it to the Lord in prayer." And, O dear friends, when you do take it to the Lord in prayer, have the men who are at work on the farm, and the girl or woman who is helping the mother—have them present. Be sure they hear the morning Bible-reading that you have selected. Have them kneel with you and the rest of the family if they will. If not, persuade them to be present, even if they do not kneel. If circumstances are such that you find it difficult to have Bible-reading and prayer in the morning, by all means ask a blessing of some kind. And that reminds me of a letter on my desk asking if I will be so kind as to give a pattern or a suggestion for a blessing to be asked at the table. I can not give you a pattern, friends. I am sure the great Father would not be pleased to have me do so; but I can give you some suggestions. I would have the blessing at the table include the thing you are anxious about—the things

you are *all* anxious about—if possible I feel as if the Holy Spirit prompts *me* not to have any two prayers or “blessings” exactly alike. If there is a general want of rain when you sit down at the table I would say, “Lord, give us the rain we are needing so much if it be consistent with thy holy will.” If it has been raining for two weeks, and everybody is wishing for sunshine (the way it is now, May 7) I would say, “Lord, give us the sunshine if it is best for us.” Then I would try to think of the things we have to be thankful for. If there are those present who represent other families or homes, let the blessing be so worded as to include them especially. If you have just succeeded in banishing the saloons from your neighborhood, do not forget to thank God for that. It would surely help the cause. If there are friends or neighbors ailing, remember them when you ask a blessing, but do not make it too long. Not only are the children restless, but many times work is crowding. We often hear complaints that prayers are too long, but seldom that they are too brief. The most effectual prayer I think I ever uttered, and the one that has brought the most wonderful and speedy answers, is my little prayer that I have told you so much about—“Lord, help.”

Now, do not forget, when you are having trouble about help in the home, or trouble on the farm, to utter that brief prayer, very often—“Lord, help.”

In our town of Medina we have quite a little colored help in the homes. Our people send off somewhere, and advance several dollars. The help sent is to pay this back in work. Now, there are excellent colored girls just as there are excellent white girls; and then there are others who seem to take advantage of you just because you undertake to treat them in a Christianlike way. They will be insolent and overbearing toward some of the sweetest-tempered and most beautiful Christian mothers. These girls do not seem to have enough intelligence to recognize the kind and benevolent spirit shown toward the people of their race. I know of one colored girl who held her place for a couple of years in a way that seemed to be a credit to herself and a credit to the mother of the home. The girl was intelligent, read one of Booker Washington’s books, and seemed to be benefited by it. She studied the Bible every day; but when there was a prospect of a new comer in the family, this girl began to be cross and overbearing, and threatened to leave. She was offered an increase in wages to fix things for a little while; but she finally declared in substance she would not work anywhere for anybody if she had got to have small children around. Notwithstanding her daily Bible-reading, her religion seemed to be only a protest against any more increase in population in this world of ours. In the effort to find another girl to take her place, girl No. 2 announced that *she* would not go anywhere, under any consideration, where there was a baby in the home; and I am informed it is

getting to be the fashion for hired girls, especially since they can get a job almost anywhere (*without references*), on almost a minute’s notice, to declare they will *not* work for people who propose to have children. I wonder if there is going to be a universal strike, and that if those who propose to live as God directed in our text will have to hire a nurse at \$4.00 a day. But I am not sure that some of this “mothers’ help” will be willing to stay even then. Now the above are some of the reasons given me why there should be so many childless homes. This world is too *busy* for children any more. Nobody wants them around. Perhaps it is because there is no room. “Of such is the kingdom of heaven,” and just now “heaven’s kingdom.”

A great deal is said in the papers about patriotism, patriotic men—patriotic *young* men, for instance—those who, instead of thinking so much about self all the while, have in mind the welfare of our nation. We used to have patriotic speeches on the Fourth of July, and we need them yet. At the time of the war with Spain there were any number of patriotic volunteers. Now, friends, a worse war threatens us—or perhaps I should say *something* worse than war—worse than ever before threatened this world of ours; and nothing can avert this terrible calamity but true patriotism; and in view of what I have outlined in the above is it not true that we need patriotic *girls* and *women*, as well as patriotic men? And I do not know but we need them even *more*—girls who have not got their heads filled with schemes to get big pay with little to do. Why, I heard a young woman, whose business in life was to help mothers, discourse eloquently on the desirableness of getting good pay in some place with rich people where there were no children around. That seemed to be her idea of heaven on earth. Are there no girls who work for a living who are interested in the future of America and American industries? Where shall we get our statesmen? where shall we get our great inventors, our electricians, our Edisons, our college professors, our learned divines, our historians, unless some of these girls who work for a living will volunteer to help the mothers in the homes? I wonder if they think a way is going to be discovered so we can people the world as they raise chickens in incubators—chickens that never had a mother and never saw one. God forbid. There are not only educated men and women in our land, but there are young girls who are devoted Christians, who not only seek beautiful homes, but try to honor God in their lives, in the language of the old hymn—

In the cross of Christ I glory,
Towering o’er the wrecks of time.

But where are the girls who sing this hymn as above? When I undertook to raise motherless chickens in Florida I decided that at the very first opportunity I was going to make a careful study of human babyhood. I want to be where I can see some child of humanity when it first begins to look about with those baby eyes, to see what this world is

like and what is going on; and I want to see them develop as I saw those chickens and studied their development. Is there not some girl (may God help us if there is not), or, say, a lot of girls, who are so much interested in the coming humanity that they will just *love* the job of taking care of the baby? There may be some woman living who is helping to take care of the future President of the United States while he is now a helpless infant. Just think what a joy it must be to such a one, if that woman is then alive, to see what is being done to hold up and inculcate this very sort of patriotism I have been trying to describe. Of course, such girls are not to work for nothing. The world is ready to give them *good pay*; and they ought to be glad of the opportunity of giving *good service*, for surely this is "the Lord's work." It rejoices my heart to know that our good President has again and again given us some grand exhortations on this subject.

Some of you may ask, "Well, Bro. Root, what lesson is it that God is striving to teach us by this scarcity of help in our homes?" Well, one lesson is, I am sure, that we must get over our craze for being in fashion. May be you call it being up with the times. I well remember the time when my two older sisters used to get up early enough on Monday morning so they had the family washing done and the clothes hung up a little after daylight. They did this rather than be kept out of school, and because mother had about all she could do to get breakfast for a family of seven without being bothered or troubled with a washing. Did these girls suffer by it? Were they behind in their lessons because of getting up so early on Monday morning? Not a bit of it. When I spoke about the children in the home—that is, those that are old enough—taking the place of the hired girls, I met something like this: "Mr. Root, things are different now from what they used to be in those old days. The girls are not only expected to dress better, but they have to be on hand at ever so many gatherings that they did not use to know anything about. Even girls who would have nothing to do with dancing and card-parties have to go to clubs, church sociables, prayer-meetings, etc. It takes time to get ready for all these various things, besides being away from home. Would you like to see *your* children worked as hard as your brothers and sisters were worked?"

My reply is, if there is no other way of making valuable citizens, both men and women, than by working as my brothers and sisters worked in the good old times, then let us get *back* a little with all our getting forward. Why, we thank God for all these short cuts that have lately come up to make necessary housework easy. Let us be careful we do not undo the results of these great benefits by mixing in too many other things. I do not believe in having so many things going on—say something almost every evening in the week to take people away from their homes beyond the bounds of reason.

After my talk with that minister's wife Hu-

ber ventured a suggestion something like this: "Father, are you sure there is such a great calamity in having things as the man expressed it—sixteen children a minute among the laboring classes, and only sixteen in a whole year among the millionaires?"

Well, if you take care of the sixteen that are born a minute in the way our United States can and ought to take care of them, perhaps Huber is right. President King, of Oberlin College, said some years ago that our large cities are absolutely dependent on our country villages for the raw material for our great men as a nation. A good many of our great men, especially wealthy men, have few or no sons; and when they do have they are brought up in such luxury that there is no good material for them to build on. The good oak timber that is so much sought for, and which brings high prices, comes from oaks that are twisted and wrenched by the storms of centuries. No such timber can be grown under glass in hot-beds; but notwithstanding this, God the father certainly lays the responsibility on our shoulders (especially we who are not only educated but patriotic) of doing our part to prevent "race suicide," as our good President has expressed it and held up as a warning.

Do the words of our text, "Be fruitful and multiply," refer only to the poor and laboring classes? Are the educated men and women—those who have means to graduate with honor in our great institutions of learning—did God mean that these should be exempt? God forbid. Further back I referred to that prominent minister and the probable necessity, in the absence of help, of being obliged to assist with the children and perhaps the housework. Some of you may suggest that it is rather expensive business for an educated divine to take the place of the average household help. But, dear friends, here is a fact that has a tremendous bearing on the question. With such hired help as I have described—say with the average hired help—the children in the home are going to be more or less biased as their little minds are molded by daily contact with these ignorant and sometimes vicious people. I told you how my incubator chickens watched every movement of mine, and caught on to something new every day. Their little intellect seemed to be like wax to take impressions and keep them. Is not this true with the baby in the home? We lament because the children of millionaires (when they have children) turn out so badly, and are of so little use in this world. Is it not owing to the environment? Now, suppose this talented and eloquent divine spends some of his time, or, if you choose, a lot of his time, in teaching and training the baby he loves. Even if he could sway hundreds by his eloquence, is it time wasted to spend a good many hours each day with that baby? Farmers are exceedingly careful to keep their young domestic animals away from vicious older ones lest they learn undesirable tricks. Shall we not be equally careful with the lit-

the ones created in God's own image and entrusted to our care? Remember what the dear Savior said—"Of such is the kingdom of heaven."

If there is a girl or woman who reads GLEANINGS and loves babies, and would like a place to work helping the mother, we should be glad to publish her name. Now who will be first on the roll of honor?

TREASURES IN HEAVEN.

The following, from the Cleveland *Leader*, ought to cause a thrill in the heart of every American citizen:

SAN FRANCISCO, April 28.—The army transport Buford, placed at the disposal of the *Christian Herald* in its effort to relieve the starving in China, will sail for China Tuesday.

Its stores of 28,000 barrels of flour, valued, with transportation charges, at \$150,000, will be taken to Chin Kiang, China. E. R. Johnstone, once editor of the Cleveland *Leader*, is commissioner in charge of the relief expedition, and will supervise the distribution in China, when the Buford's four-week trip ends.

Commissioner Johnstone and Rev. Dr. Talmage will speak at services on the pier just before the sailing of the ship.

And the above ought to make every man, woman, and child feel happy that they have got something invested in that shipload of flour. If you neglected to invest something when the call came, make haste and get something in the next shipload; and then rejoice that you have got some treasure laid up in heaven, where moth and rust doth not corrupt, and where thieves do not break through and steal.

FLYING THROUGH THE AIR, SKIMMING OVER THE WATER, ETC.

For some time past I have had in mind something on the principle of a flying-machine, to be used on the water, not in the water, like a boat, but to skim over the surface of it the way flying-fish do sometimes. My plan is to have a machine propelled by propellers that work in the air, so that the craft could, if desired, get clear out of the water and skim on the surface or over the surface, sinking back into the water when the speed slackens or when the operator wants to stop. The higher the speed, the higher out of the water the craft would navigate. Of course, this is not new. Experiments along the same line have been made across the water as well as here in America. You may imagine with what interest I read over and over the following which I copy from the Dayton *Journal* of March 1, 1907:

WRIGHT BOYS SCORE ANOTHER TRIUMPH.

INVENT A HYDROPLANE AND ATTRACT WIDESPREAD ATTENTION BY THEIR EXPERIMENTS IN MIAMI RIVER NEAR BRIDGE-STREET BRIDGE—ENGINE REFUSED TO WORK AND TEST IS INCOMPLETE.

Orville and Wilbur Wright, the inventors of the famous Wright flyer, who have startled the scientific world with the wonderful progress they have made in connection with the difficult problem of aerial navigation, have diverted their attention for a time to new channels and have invented a hydroplane which bids fair to elicit widespread attention.

The art of secretiveness has been thoroughly mastered by the Wright Brothers, and entirely without the knowledge of their most intimate friends they have perfected their most recent invention. Yesterday they put their queer little craft to a practical test on the Miami River, near the River-Street bridge.

There is but little overt appearance to distinguish the boat from the ordinary vessel of its size, save the fact that there is no visible means of propulsion. The motive power is furnished by a 20-horse-power gasoline-engine, and this part of the entire device was the only obstacle in the way of perfect success in the experiment. The engine refused to operate properly, and, of course, the test was unsatisfactory.

Another distinction of the hydroplane, however, is the fact that it is so constructed that there is very little displacement of water, the craft being practical, even for water but a few feet deep. The front of the vessel has an upward tendency as if supported by aerial buoyancy.

This is not the first hydroplane that has been invented, although never before has such a craft been seen in local waters, or ever been devised by any one in this section of the country. It promises to become another triumph of more than passing interest for the Dayton inventors who have already attained international renown by their marvelous achievements in the degree of perfection they have realized in the field of aerial navigation.

In a talk with the Wright Brothers a few days ago they said such an apparatus might, without question, make more than a mile a minute, rivaling the ice-boats which fly over the frozen lakes in winter. They do not, however, seem to think it worth while to experiment further in that direction, since they have succeeded in flying so easily through the air. The machine described in the above clipping was operated first by one person. When they found it would go all right both the brothers got aboard, and finally one of their helpers besides. This sunk it so low in the water that the blades of the propeller made the water fly pretty lively. The craft was given buoyancy by a couple of hollow drums filled with air. The above experiment was made with one of their old discarded engines, and the power was hardly sufficient to make high speed. There would be one advantage in making experiments of this kind, for in case of accident the operator would be in the water where he could be rescued instead of being up in the clouds. Well, friends, I can not help thinking that some of us may live to see the time when we shall have crafts skimming over the water at a higher rate of speed than automobiles now move over the best roadbeds.

In regard to the above I have just received from the Wright Brothers the following statement:

Dear Mr. Root:—Our only objection to publishing any thing about our experiments is that it may cause people to write us for information, and we haven't the time for answering.

WRIGHT BROTHERS.

Dayton, Ohio, May 2.

THERE will be an international pure-food exposition held in the Coliseum Building, Chicago, from Nov. 19th to the 25th. Now, why not get together and make a grand display of honey and beeswax? The time, the date, and the place are all that can be desired. What is wanted now is a display that will surpass any thing of the kind ever seen anywhere. If the National will take hold, this can be accomplished.

Special Notices by A. I. Root.

"THE LAND OF BEULAH," ETC.

Since I gave the words of the little hymn on p. 498 (GLEANINGS for April 1) I have been informed the verses were composed by Mrs. Harriet Warner Re Qua, of Winterset, Iowa. This lady is also the author of a book of poems that have been very warmly received and highly commended by many of our great religious journals, by Ira D. Sankey, Francis E. Willard, and other noted Christian workers.

While speaking about poems and hymns, one of the kind friends who reads GLEANINGS has furnished me with the words and music that impressed me so much at the close of Wooley's address at St. Louis last fall (see, page 187, Feb. 1st). The title is, "The King's Business." I am told it is one of the revival hymns used by Torrey in his recent meetings in Cleveland. The friend who was so kind as to tear out a leaf from the hymn-book and send it to me recognized it by the closing words, "Oh, be ye reconciled to God!" We have made arrangements so we can mail this latter hymn, with the words and music, on receipt of a two-cent stamp.

CELERY CULTURE THROUGHOUT THE UNITED STATES.

A beautiful little bulletin, just published by the Department of Agriculture, is in my hands. It contains 36 pages, and is full of excellent illustrations. I planned to make mention of celery-growing, which has lately become a great industry in the southern part of Florida; but this bulletin goes over the whole ground so well I think I will not take up the subject again. By the way, I notice that now in Florida, and perhaps other places, the celery is taken up and trimmed and crated out in the fields, without any washing. The washing and final trimming are done at the destination. A few years ago it was thought necessary to trim and wash thoroughly before shipment. The growers told me that it keeps much better in transit without being wet at all before shipment. I should hardly dare to tell you how much money some of the Florida growers get per acre. Of course, it costs more down there where such expensive fertilizers are needed; and one of the most beautiful sights—beautiful to the nostrils as well as the eye—is to see a gang of men harvesting a successful up-to-date crop of celery. The tempting perfume is carried by the wind quite a distance from the field. Now, if you wish to grow only a little celery for your own use in the garden, you should send for this bulletin; and if you make a business of growing celery for the market, it ought to be worth dollars to you. Address United States Department of Agriculture, Washington, D. C., asking for Celery Bulletin, No. 282.

"WHAT TO DO, AND HOW TO BE HAPPY WHILE DOING IT."

The above is the title of a book published in 1888, and appendix added in 1900. This book was published at a time when great numbers of people were out of work, and it has had quite a sale. Just now, while everybody has a job, no matter whether "good, bad, or indifferent," there is, perhaps, not quite so much of a call for the book; but I think it will still be found to be very helpful to people who are getting interested in gardening, growing stuff under glass, and all other rural pursuits. I have looked it over very carefully to see whether I would at present approve of the several chapters on poultry, written in 1888. I am glad to tell you that my experience since then corroborates every thing I then wrote. The book contains over 200 pages the size of GLEANINGS; and it is almost the only book that gives full details of steam-heated hot-beds. While the scope of the book is principally agricultural, and written in a way to make it attractive to the young, it also upholds righteousness, temperance, and purity more or less all the way through. It has been my happy privilege to give the world quite a few useful books, but I deem this one of the best of them, although it has but little to say in regard to bee culture. The price of the book is, in paper covers, 50 cents; but in order to get it before the people we will send it for \$1.35 with GLEANINGS for one year. If you have already paid for GLEANINGS, send us 35 cents. If you want the cloth-bound edition, send 60 cents instead of 35 cents.

"GOLD-MINE" SWINDLERS ETC.

Collier's Weekly for May 4 gives about the best warning in regard to the gold-mine swindles of any thing I have ever come across. Not only are these human vultures hunting up the deacons of our churches but ministers of the gospel, and even the governors of our States, to add character and confidence to the gambling speculations. Something over a year ago a relative of mine, younger than I, was persuaded to invest in a gold-mine. I did every thing I could to keep him out of it; but the promoter was a deacon in the church, and the company finally agreed to pay his way to a mine in Colorado and back again if he would just "look the thing over." For a time it seemed all right, and clear sailing. But recently this deacon in the church died, and then his villainy came to light. My relative, to use his own words, said, "The rottenness of the whole institution was simply disgusting." His money is gone; but he has some recompense in the fact that he is probably for ever cured of his desire for gold-mine investments.

The *Chicago Evening Post* says:

"The public can expect nothing from the human vultures who prey upon the poor and weak through oil, mining, or other schemes of wildcat finance. But it has a right to expect protection from its reputable press. That this is refused is the gravest indictment lying against American journalism to-day."

"R. G. Dun & Co. say, during the past year more than one hundred and fifty million dollars have been blown in on fakes, largely mining stocks, not a dollar of which will ever be returned to the investors."

A \$5.00 POULTRY-BOOK.

In many of the poultry-journals just now we find the following advertisement:

PROFITS IN POULTRY-KEEPING SOLVED.

Title of my new book, which is revolutionizing the poultry business all over the country. My great feed at 10¢ per bushel will save you \$25.00 on every 100 hens you feed a year, as well increase your egg yield over 30 per cent. Nothing like it ever discovered for producing winter eggs and fertile eggs. For growing chicks, it has no equal. No mashes or cooking feed under this great system. Broilers grow 1 1/4 lb. in 7 weeks on it. No science required to feed by my system. Failure impossible. Start right. Circulars and testimonials free. Write to-day and stop that big feed-bill.

EDGAR BRIGGS,
New Rochelle, N. Y.

The author informs us that this information is given only through his \$5.00 book. Well, that book, which I now hold in my hand, is a paper-covered pamphlet of only 71 pages. I am sorry to make this criticism, because the writer of the book is one who has taken GLEANINGS toward 20 years, so he tells me. I suppose the excuse for charging \$5.00 for a 25-cent perhaps a 50-cent poultry-book is for the valuable information it contains, especially that part about feed at 10 cents a bushel. This food is sprouted oats; and as one bushel well sprouted will make three or four bushels, the cost of the product may be only 10 cents per bushel or less. Where poultry is confined, or at seasons of the year when the fowls have no access to green food, this, no doubt, is a great help, but it is not new. On p. 112, Jan. 15, I wrote the following:

Green food I furnish in my yard by burying rather more corn and wheat than they scratch out before it sprouts, and they enjoy digging up the sprouted grain fully as much as if they had gotten into your garden.

Besides, the same information has been given in our poultry and other journals. See the following, which I clip from *Poultry Husbandry* for April, the same periodical in which I found the advertisement:

GREEN STUFF.

Sometimes oats sprouted in thin layers of soil on plates or in shallow boxes supply the first green food.

The book in question is well written, and contains perhaps more than the average amount of information to be found in our cheap poultry-books; but I hope our good brother will furnish all who have sent him \$5.00 a good large cloth-bound book or else send back a part of the money he has received. A new enlarged edition of the book is already under way.

If this sprouted grain is really of such great value for poultry, why should it not be of like value for other domestic animals? We all know how fond crows are of sprouted corn; and, by the way, I have just been feeding our Rhode Island Reds some of the corn that was sprouted in testing our seed corn. Those that were confined in the yard would take down with great avidity grains of corn with sprouts and roots an inch or two long. The sprouting process converts the starch into sugar; and we have malted nuts and other malted products on the market already for human food. Very likely this is a matter of much importance; but is it right to charge \$5.00 for calling attention to something that is already pretty well known?

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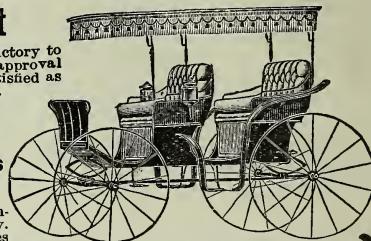
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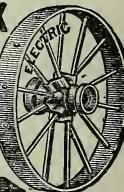
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